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Color TV
Service Manual

Model:
CT-21CBS5CPH

Chassis:ETA-1

CONTENTS

SAFETY INSTRUCTIONS AND MAINTENANCE **4**

SAFETY PRECAUTION 5

PRODUCT SAFETY NOTICE 6

SAFETY SYMBOL DESCRIPTION 7

MAINTENANCE 8

MECHANICA DISASSEMBLING 9

ADJUSTMENTS **11**

SET-UP ADJUSTMENTS 11

CIRCUIT ADJUSTMENTS 14

STRUCTURE AND CHASSIS FUNCTION DESCRIPTION **20**

STRUCTION BLOCK DIAGRAM 20

SERVICE DATA **22**

TECHNICAL DATA OF KEY ICs 22

SERVICE DATA OF KEY ICs 43

APPENDIX **47**

CIRCUIT DIAGRAM

PARTS LIST

Please read this manual carefully before service.

SERVICE SAFETY AND MAINTENANCE

WARNING:
BEFORE EXAMINING AND SERVICING THIS CHASSIS READ CAREFULLY THE FOLLOWING SAFETY INSTRUCTIONS.

X-RAY RADIATION PRECAUTION

1. The EHT must be checked every time the TV is serviced to ensure that the CRT does not emit X-ray radiation as result of excessive EHT voltage. The maximum EHT voltage permissible in any operating circumstances must not exceed the rated value. When checking the EHT, use the High Voltage Check procedure in this manual using an accurate EHT voltmeter.
2. The only source of X-RAY radiation in this TV is the CRT. The TV minimizes X-RAY radiation, which ensures safety during normal operation. To prevent X-ray radiation, the replacement CRT must be identical to the original fitted as specified in the parts list.
3. Some components used in this TV have safety related characteristics preventing the CRT from emitting X-ray radiation. For continued safety, replacement component should be made after referring the PRODUCT SAFETY NOTICE below.
4. Service and adjustment of the TV may result in changes in the nominal EHT voltage of the CRT anode. So ensure that the maximum EHT voltage does not exceed the rated value after service and adjustment.

SAFETY PRECAUTION

WARNING:
REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.

1. The TV has a nominal working EHT voltage. Extreme caution should be exercised when working on the TV with the back removed.

   a. Do not attempt to service this TV if you are not conversant with the precautions and procedures for working on high voltage equipment.

   b. When handling or working on the CRT, always discharge the anode to the TV chassis before removing the anode cap in case of electric shock.

   c. The CRT, if broken, will violently expel glass fragments. Use shatterproof goggles and take extreme care while handling.

   d. Do not hold the CRT by the neck as this is a very dangerous practice.

2. It is essential that to maintain the safety of the customer all power cord forms be replaced exactly as supplied from factory.

3. Voltage exists between the hot and cold ground when the TV is in operation. Install a suitable isolating transformer of beyond rated overall power when servicing or connecting any test equipment for the sake of safety.

4. When replacing ICs, use specific tools or a static-proof electric iron with small power (below 35W).

5. Do not use a magnetized screwdriver when tightening or loosing the deflection yoke assembly to avoid electronic gun magnetized and decrement in convergence of the CRT.

6. When remounting the TV chassis, ensure that all guard devices, such as nonmetal control buttons, switch, insulating sleeve, shielding cover, isolating resistors and capacitors, are installed on the original place.

7. Replace blown fuses within the TV with the fuse specified in the parts list. 8. When replacing wires or components to terminals or tags, wind the leads around the terminal before soldering. When replacing safety components identified by the international hazard symbols on the circuit diagram and parts list, it must be the company-approved type and must be mounted as the original.

8. Keep wires away from high temperature components.

PRODUCT SAFETY NOTICE

CAUTION:
FOR YOUR PROTECTION
THE FOLLOWING PRODUCT SAFETY NOTICE SHOULD BE READ CAREFULLY BEFORE OPERATING AND SERVICING THIS TV SET.

1. Many electrical and mechanical components in this chassis have special safety-related characteristics. These characteristics are often passed unnoticed by a visual inspection and the X-ray radiation protection afforded by them cannot necessarily be obtained by using replacements rated at higher voltages or wattage, etc. Components which have these special safety characteristics in this manual and its supplements are identified by the international hazard symbols on the circuit diagram and parts list. Before replacing any of these components read the parts list in this manual carefully. Substitute replacement components which do not have the same safety characteristics as specified in the parts list may create X-ray radiation.
2. Do not slap or beat the cabinet or CRT, since this may result in fire or explosion.
3. Never allow the TV sharing a plug or socket with other large-power equipment. Doing so may result in too large load, causing fire.
4. Do not allow anything to rest on or roll over the power cord. Protect the power cord from being walked on, modified, cut or pinched, particularly at plugs.
5. Do not place any objects, especially heavy objects and lightings, on top of the TV set. Do not install the TV near any heat sources such as radiators, heat registers, stove, or other apparatus that produce heat.
6. Service personnel should observe the SAFETY INSTRUCTIONS in this manual during use and servicing of this TV set. Otherwise, the resulted damage is not protected by the manufacturer.

SAFETY SYMBOL DESCRIPTION

The lightning symbol in the triangle tells you that the voltage inside this product may be strong enough to cause an electric shock. Extreme caution should be exercised when working on the TV with the back removed.

This is an international hazard symbol, telling you that the components identified by the symbol have special safety-related characteristics.

FDA This symbol tells you that the critical components identified by the FDA marking have special safety-related characteristics.

UL This symbol tells you that the critical components identified by the UL marking have special safety-related characteristics.

C UL This symbol tells you that the critical components identified by the C-UL marking have been evaluated to the UL and C-UL standards and have special safety-related characteristics.

VDE This symbol tells you that the critical components identified by the VDE marking have special safety-related characteristics.

MAINTENANCE

1. Place the TV set on a stable stand or base that is of adequate size and strength to prevent it from being accidentally tipped over, pushed off, or pulled off. Do not place the set near or over a radiator or heat register, or where it is exposed to direct sunlight.

2. Do not install the TV set in a place exposed to rain, water, excessive dust, mechanical vibrations or impacts.

3. Allow enough space (at least 10cm) between the TV and wall or enclosures for proper ventilation.

4. Slots and openings in the cabinet should never be blocked by clothes or other objects.

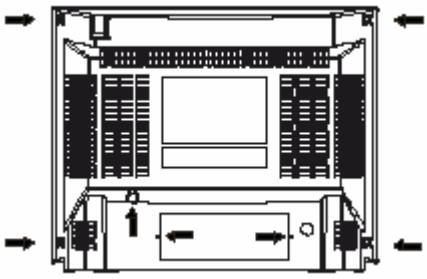
5. Please power off the TV set and disconnect it from the wall immediately if any abnormal condition are met, such as bad smell, belching smoke, sparkling, abnormal sound, no picture/sound/raster. Hold the plug firmly when disconnecting the power cord.

6. Unplug the TV set from the wall outlet before cleaning or polishing it. Use a dry soft cloth for cleaning the exterior of the TV set or CRT screen. Do not use liquid cleaners or aerosol cleaners.

MECHANICA DISASSEMBLIES

CABINET BACK REMOVAL

1. Refer to Figure 1, remove 7screws.
2. Pull off cabinet back and remove.



CHASSIS REMOVAL

1. Remove cabinet back.
2. Discharge the picture tube anode (2nd anode lead) to the dag coating (picture tube grounding lead).
3. Disconnect Degaussing coil socket (KE). Picture tube socket, Deflection yoke connector (KDY). Speaker connectors (KL and KR), and 2nd anode lead.
4. Remove chassis completely by sliding it straight back.

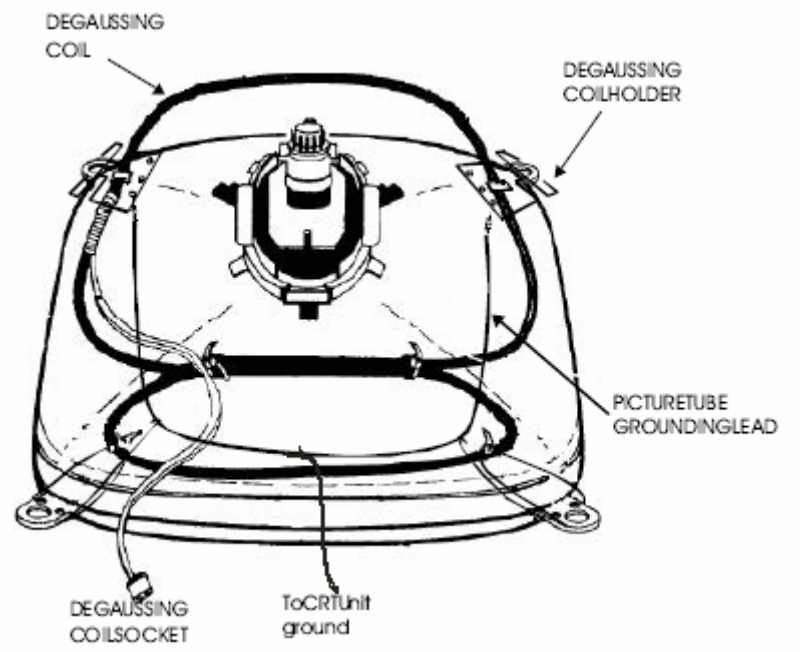
PICTURE TUBE REMOVAL

CAUTION: Do not disturb the deflection yoke or magnet assembly on the picture tube Neck.

Care must be taken to keep these assemblies intact, unless picture tube is being replaced. Discharge the picture tube to the coating before handing the Tube.

1. Remove chassis, referring to Chassis Removal instructions.
2. Place cabinet front face down on the soft surface.
3. Remove the screw one ach corner of the picture tube and GENTLY lift the picture tube out of the cabinet.
4. Install a replacement picture tube in reverse order.
5. Properly install the degaussing coil and picture tube grounding lead on the picture tube. SeeFigure2.

Note: If the Picture Tube is being replaced, mount the Degaussing Coi l on the picture tube. See following Figure1.Cabinet Back Removal



ADJUSTMENTS

SET-UP ADJUSTMENTS

The following adjustments should be made when a complete realignment is required or a new picture tube is installed.

Perform the adjustments in the following order:
1. Color purity
2. Convergence
3. White balance

Notes:

1. The purity/convergence magnet assembly and rubber wedges need mechanical ositioning. Refer to Fig1, 2.

2. For some picture tubes, purity/ convergence adjustments are not required.

1. Color Purity Adjustment

Preparation:

Before starting this adjustment, adjust the vertical sync, horizontal sync, vertical amplitude and focus.

1.1 Face the TV set north or south.

1.2 Connect the power plug into the wall outlet and turn on the main power switch of the TV set.

1.3 Operate the TV for at least 15 minutes.

1.4 Degauss the TV set using a specific degaussing coil.

1.5 Set the brightness and contrast to maximum.

1.6 Counter clockwise rotate the R /B low brightness potentiometers to the end and rotate the green low brightness potentiometer to center.

1.7 Receive green raster pattern signals.

1.8 Loosen the clamp screw holding the deflection yoke assembly and slide it forward or backward to display a vertical green zone on the screen. Rotate and spread the tabs of the purity magnet around the neck of the CRT until the green zone is located vertically at the center of the screen.

1.9 Slowly move the deflection yoke assembly forward or backward until a uniform green screen is obtained.

1.10 Tighten the clamp screw of the assembly temporarily. Check purity of the red raster and blue raster until purities of the three rasters meet the requirement.

2. Convergence Adjustment

Preparation:

Before attempting any convergence adjustment, the TV should be operated for at least 15 minutes.

2.1 Center convergence adjustment

2.1.1 Receive dot pattern.

2.1.2 Adjust the brightness/contrast controls to obtain a sharp picture.

2.1.3 Adjust two tabs of the 4-pole magnet to change the angle between them and red and blue vertical lines are superimposed each other on the center of the screen.

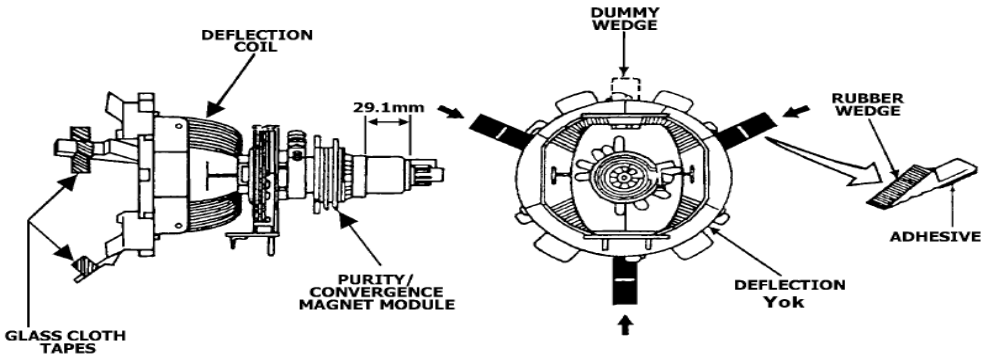


Fig. 1

2.1.4 Turn both tabs at the same time keeping the angle constant to superimpose red and blue horizontal on the center of the screen.

2.1.5 Adjust two tabs of the 6-pole magnet to superimpose RED/BLUE line and green line.

2.1.6 Remember RED and BLUE movement. Repeat step 2.1.3 ~ 2.1.5 until optimal convergence is obtained.

2.2 Circumference convergence adjustment

2.2.1 Loosen the clamp screw holding the deflection yoke assembly and allow it tilting.

2.2.2 Temporarily put the first wedge between the picture tube and deflection yoke assembly. Move front of the deflection yoke up or down to obtain better convergence in circumference. Push the mounted wedge in to fix the yoke temporarily.

2.2.3 Put the second wedge into bottom.

2.2.4 Move front of the deflection yoke to the left or right to obtain better convergence in circumference.

2.2.5 Fix the deflection yoke position and put the third wedge in either upper space. Fasten the deflection yoke assembly on the picture tube.

2.2.6 Detach the temporarily mounted wedge and put it in either upper space. Fasten the deflection yoke assembly on the picture tube.

2.2.7 After fastening the three wedges, recheck overall convergence and ensure to get optimal convergence. Tighten the lamp screw holding the deflection yoke assembly.

3. White Balance Adjustment

Generally, white balance adjustment is made with professional equipment. It's not practical to get good white balance only through manual adjustment. For TVs with I²C bus control, change the bus data to adjust white balance.

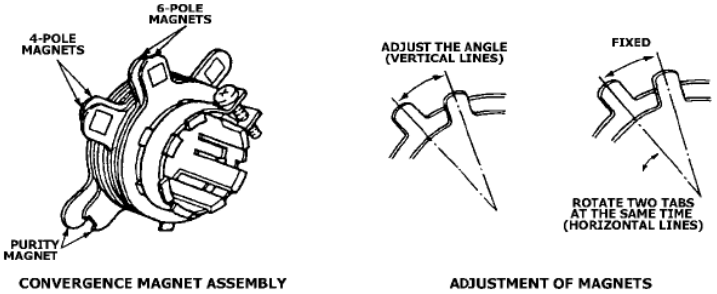


Fig. 2

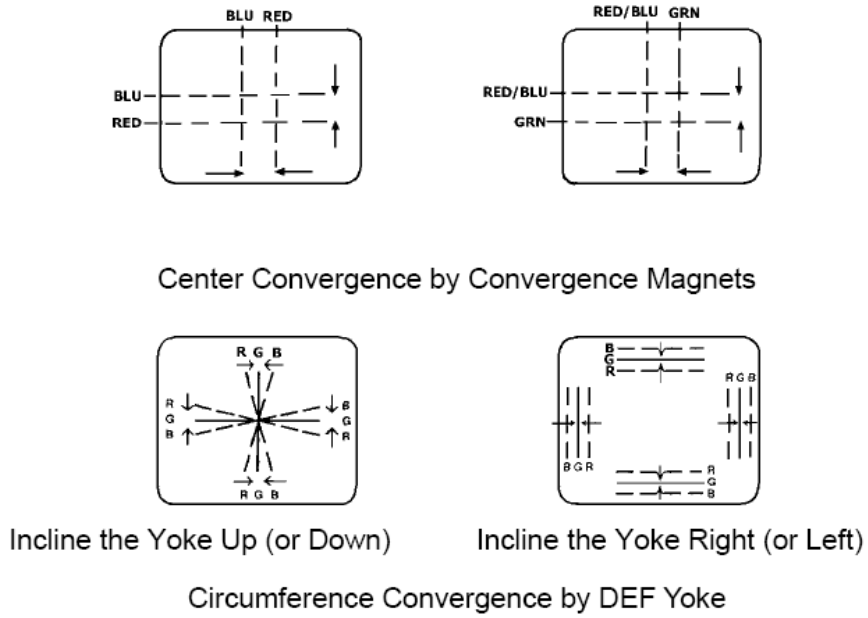


Fig.3

CIRCUIT ADJUSTMENTS

Preparation:
Circuit adjustments should be made only after completion of set-up adjustments. Circuit adjustments can be performed using the adjustable components inside the TV set. For TVs with I_2C bus control, first change the bus data.

1. Degaussing

A degaussing coil is built inside the TV set. Each time the TV is powered on, the degaussing coil will automatically degauss the TV. If the TV is magnetized by external strong magnetic field, causing color spot on the screen, use a specific degausser to demagnetize the TV in the following ways. Otherwise, color distortion will be shown on the screen.

1.1 Power on the TV set and operate it for at least 15 minutes. 1.2 Receive red full-field pattern.
1.3 Power on the specific degausser and face it to the TV screen.

1.4 Turn on the degausser. Slowly move it around the screen and slowly take it away from the TV. 1.5 Repeat the above steps until the TV is degaussed completely.

2. Confirmation and Adjustment for Voltage

Caution: +B voltage has close relation to high voltage. To prevent X-ray radiation, set +B voltage to the rated value.

2.1 Make sure that the supply voltage is within the range of the rated value.

2.2 Connect a digital voltmeter to the voltage output terminal of the main PCB. Power on the TV and set the brightness and sub-brightness to minimum. Ensure that the voltage from the main PCB reads as follows.

2.3 Regulate voltage adjustment components on the power section until the +B the voltage reaches the rated value.

Table 1

Test Point	Voltage (V)	Test Point	Voltage (V)
TP-130V	130V±1.5V	TP-18V	20V±1V
TP-17V	17V±1V	TP-5V-2	5V±0.3V
TP-5V-1	5V±0.3V	TP-8V	8V±0.5V
TP-11V	11V±1V	TP-26V	26V±1V
Tp200V	190V±5V		

Note:

It's impossible to check the power part separately from the main chassis board as the part is mounted on the main chassis board. The power components, etc. should be checked for burnout when power-on. If burned out, do not power on the TV again until the cause is found out.

3. High Voltage Inspection

Measure voltages of test points on the main PCB with the digital voltmeter. Measure the CRT high voltage with the high-voltage testing equipment and heater voltage with the high-frequency effective voltmeter. The rated values are shown as below.

Table 2

Test Point	Voltage (V)
Negative of VD461	26 / 1V
Negative of VD485	190 / 5V
CRT Anode	27 / 1.5KV
Heater	6.3 / 0.3Vrms

4. Focus Adjustment

Caution: Dangerously high voltages are present inside the TV. Extreme caution should be exercised when working on the TV with the back removed.

4.1 After removing the back cover, look for the FBT on the main PCB. There should be a FCB on the FBT.

4.2 Power on the TV and preheat it for 15 min.

4.3 Receive a normal TV signal. Rotate knob of the FCB until you get a sharp picture.

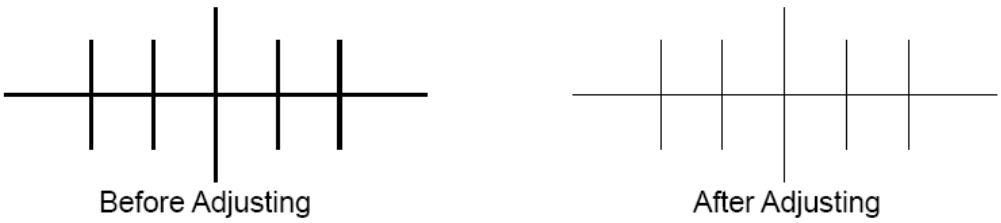


Fig. 4

5. Safety Inspection

5.1 Inspection for insulation and voltage-resistant

Perform safety test for all naked metal of the TV. Supply high voltage of 3000V AC, 50Hz (limit current of 10mA) between all naked metal and cold ground. Test every point For 3 sec. and ensure no arcing and sparking.

5.2 Requirements for insulation resistance

Measure resistance between naked metal of the TV and feed end of the power cord to be infinity with a DC-500 high resistance meter and insulation resistance between the naked metal and degaussing coil to be over 200mΩ

6. SERVICE mode

6.1 To enter the DESIGN/SERVICE mode

Set the volume to 0. Then press and hold the MUTE button on the remote control, and press the MENU button on the TV to enter the SERVICE mode. In this case, red “s” is displayed on the upper center of the screen. To exit from the S mode, turn off the TV set by the POWER button on the remote control.

Caution: The user service mode adjustment can be changed only when service personnel adjust the whole set data during servicing. As the control data have dramatic effects on functions and performance of the TV, service personnel should not tell user how to enter the SERVICE mode to avoid improper data settings.

6.2 Adjustment bus data (GDET0101-07)

Table 3 Function Description for Bus Data

	Symbol	Description	Data
PAGE1	OSD	OSD Horizontal Position	29
	OPT	Optional Setting	B3
	RCUT	R CUT OFF	OPT
	GCUT	G CUT OFF	OPT
	BCUT	B CUT OFF	OPT
	GDRV	G DRIVE	OPT
	BDRV	B DRIVE	OPT
	SCNT	SUB CONTRAST	05
PAGE2	CNTN	CONTRAST MIN	0A
	CNTC	CONTRAST CENTER	3B
	CNTX	CONTRAST MAX	7A
	CNTD	CONTRAST MAX IN DVD	F7
	BRTN	BRIGHT MIN.(difference from center)	20
	BRTC	BRIGHT CENTER	40
	BRTX	BRIGHT MAX.(difference from center)	20
	BRTS	SUB BRIGHT	FB
PAGE3	COLC	COLOR CENTER NTSC	33
	COLP	COLOR CENTER PAL(difference from COLC)	02
	COLD	COLOR CENTER DVD	05
	COLN	COLOR MIN.	0D
	COLX	COLOR MAX.(difference from center)	45
	TNTN	TINT MIN.(difference from center)	28
	TNTC	TINT CENTER	40
	TNTX	TINT MAX.(difference from center)	28
PAGE4	ST3	SHARP CENTER 3.58NTSC TV	19
	ST4	SHARP CENTER OTHER TV	19
	SV3	SHARP CENTER 3.58NTSC VIDEO	1D
	SV4	SHARP CENTER OTHER VIDEO	1D
	SVD	SHARP CENTER DVD	1B
	ASSH	ASYMMETRY-SHARPNESS	05

(continued)

	SHPN	SHARP MIN(difference from center)	10
	SHPX	SHARP MAX(difference from center)	16
PAGE5	ABCL	ABL date in detail	0C
	DCBS	A part of Video date in detail	15
	CLTB	The date when TV mode & SOUND SYS = B/G	8A
	CLTD	The date when TV mode & SOUND SYS = D/K	86
	CLTM	The date when TV mode & SOUND SYS = M	AC
	CLVO	The date when YUV mode & SOUND SYS != M	AD
	CLVD	The date when YUV mode & SOUND SYS = M	88
	OSDA	OSD ABL and OSD CONTRAST	01
PAGE6	HPOS	Horizontal Position	OPT
	HPS	Horizontal Position 60Hz(difference from HPOS)	OPT
	VP50	Vertical Position 50Hz	OPT
	VP60	Vertical Position 60Hz	OPT
	HIT	Hight 50Hz	OPT
	HITS	Hight 60Hz(difference from HIT)	OPT
	VLIN	V Linearity 50Hz	OPT
	VLIS	V Linearity 60Hz(difference from VLIN)	OPT
PAGE7	VSC	VS Correction 50Hz	OPT
	VSS	VS Correction 60Hz	OPT
	HBOW		OPT
	HPARA		OPT
	UBLACK		0B
	VBLACK		0B
	AGC	RF AGC	30
	HAFC	AFC GAIN	86
PAGE8	NOIS		0F
	NDTC	Noise detection count test	1F
	MUTT	Y-MUTE FOR SOFT START	00
	STAT	CONTRAST UP FOR SOFT START	00
	VL1	ALC off volume control level	09
	VL25	No use	3D
	VL50	No use	57
	VLX	No use	7F
PAGE9	VA1	volume level when ALC on(IC VER1.2_old)	19
	VA12	No use	25
	VA25	No use	3D
	VA50	No use	57
	VAX	No use	7F
	SVM	MON/SVM CO MAX SVM DL SVM GAIN	10
	VBLK	V BLK start V BLK stop	00
	VCEN	V CENTERING	17
PAGE10	VB1	volume level when ALC on(IC VER1.2_new)	09
	VB25	No use	3D
	VB50	No use	57
	VBX	No use	7F
	FLG0	FLAGS for IF	44
	FLG1	FLAGS	00
	UCOM	Miciom control	00

(continued)

	OSDF	OSD PLL DATE	6A
PAGE11	TB_COL	Menu top OSD area plane color set	9B
	BB_COL	Menu itmes OSD area plane color set	BD
	CL_COL1	Calendar OSD color	02
	CL_COL2	Calendar OSD color	02
	PYNX	Normal H.SYNC max	33
	PYNN	Normal H.SYNC min	11
	PYXS	Search H.SYNC max	22
	PYNS	Search H.SYNC min	1E
PAGE12	RCUTS	R cut offset in DVD	00
	GCUTS	G cut offset in DVD	00
	BCUTS	B cut offset in DVD	00
	GDRVS		00
	BDRVS		00
	AUSTP		04
	BBCT		04
PAGE13	STBG	S TRAP B/G	06
	STI	S TRAP I	08
	STDK	S TRAP D/K	08
	STM	S TRAP M	01
	SSBG	S TRAP HP/LP B/G	08
	SSI	S TRAP HP/LP I	08
	SSDK	S TRAP HP/LP D/K	08
	SSM	S TRAP HP/LP M	09
PAGE14	SYNC		04
	SYBBN	BB judgement	00
	SYBBF	BB judgement	00
	SYSR	Set WIN Pulse and HLOCK Pulse	20
	VCD0		00
	VCD1		00
	BL25	Balance 25	1E
	BL49	Balance 49	50
PAGE15	MODE0		29
	MODE1		0F
	OV50		00
	OV60		00
	HOTEL		00
	FM RADIO		01
	SOUND M		01
	SCR SAV		01
PAGE16	ENGLISH		01
	FRENCH		01
	GERMAN		01
	RUSSIAN		00
	INDONESIAN		01
	MALAY		01
	KOREA		01
	ARABIC		00
PAGE17	INITIAL		00
	LOCK MENU		01
	CALENDAR		01
	INFOMENU		01
	DEMOKEY		01
	SVIDEO		01
	DVDVIDEO		01
	LOGO		00

(continued)

PAGE18	LOGO1COLOR		OPT
	LOGO2COLOR		OPT
	LOGO1LINE		OPT
	LOGO2LINE		OPT
	LOGO1SIZE		OPT
	LOGO2SIZE		OPT
	LG1		OPT
	LG2		OPT

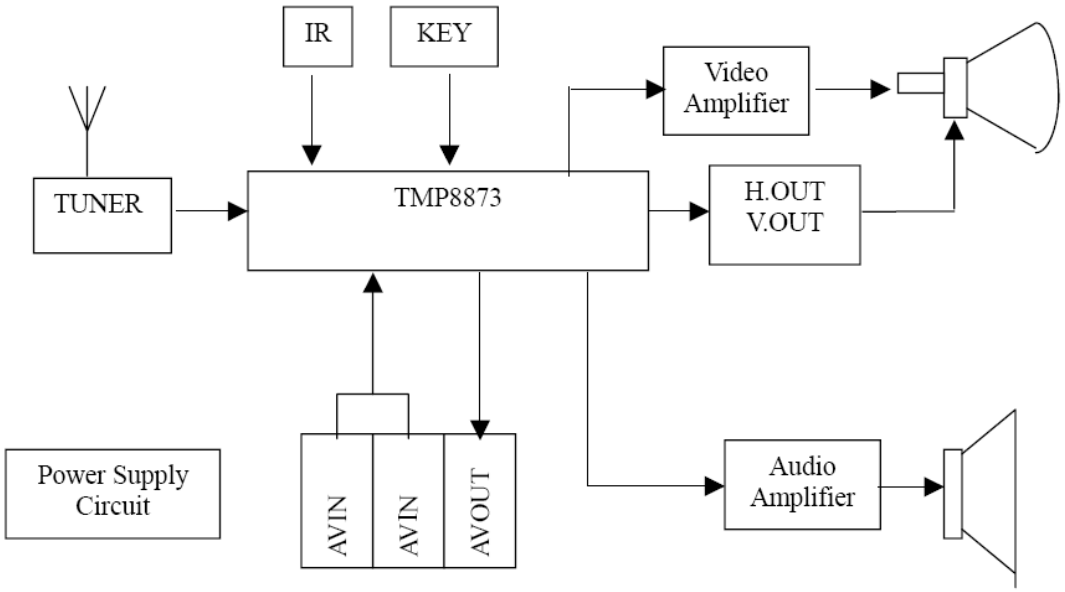
Notes:

① The data sheet may differ dependent on different models.

② The data sheet may differ dependent on different CRTs for the same model.

STRUCTURE and CHASSIS FUNCTION DESCRIPTION

1. BLOCK DIAGRAM



2. CHASSIS DESCRIPTION

General Description

ETA-1 chassis is applied in SF21GA63 series.

By use of Toshiba V/C/D-MCU 2IN1 IC for TV small signal processing and bus control, the chassis enables TV tuning, adjustment, control and picture correction, featuring high-integration, high-performance-to-price ratio and high-reliability and compact circuit with fewer external components. The chassis, widely used in small and medium TVs, provides much more convenience for manufacturing and technical service. It includes:

- 2IN1 IC TMPA8873PSANG-4VB6 for PAL/NTSC small signal processing and bus control
- EEPROM AT24C16 for data memory
- LA78040 for vertical output power amplifying
- TFA9842AJ for audio power amplifying
- Thick-film IC STR-G5653 for power circuit adjustment and control

The following features are available in the chassis:

- Color systems: PAL, NTSC
- Sound systems: D/K B/G I M
- 236 programs preset
- AV stereo
- I2C bus control
- Electronic program table
- Intelligent lock
- Biorhythm
- Calendar inquiry

The chassis mainly uses the following ICs and assemblies.

Table 5 - Key ICs and Assemblies

Serial No.	Position	Type	Description
1	N201	AT24C16	EERPOM
2	N202	GDET0101-07 (TMPA8873PSANG)	2IN1 IC (Small signal processor + micro control unit (MCU))
3	N603	TFA9842AJ	Audio power amplifier
4	N301	LA78040	Vertical scan output stage circuit
5	N801	STR-G5653	Switch-mode power supply control
6	A001	TAF5-C4I21	Tuner

SERVICE DATA

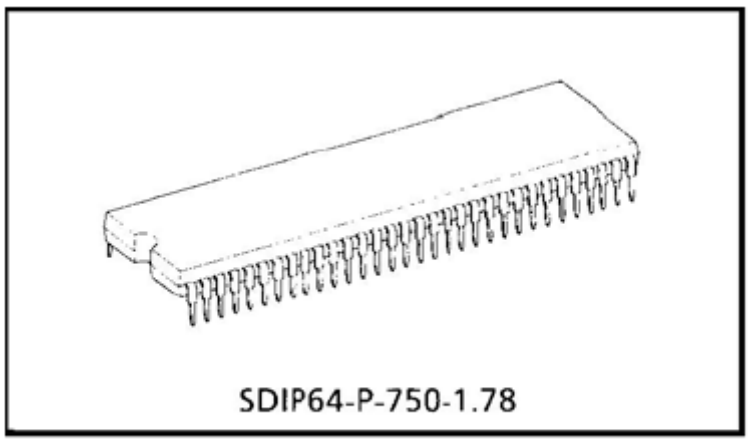
TECHNICAL DATA OF KEY ICS

1.MCU and Signal Processor for a PAL/NTSC TV TMPA8873CMANG /CPANG/CRANG /CSANG

1.General Description

The TMPA8873CPANG is an integrated circuit for a PAL/NTSC TV. A MCU and a TV signal processor are integrated in a 64-pin shrink DIP package. The MCU contains 8-bit CPU, ROM, RAM, I/O ports, timer/counters, A/D converters, an on-screen display controller, remote control interfaces, IIC bus interfaces and the Closed Caption decoder. The TV signal processor contains PIF, SIF, Video, multi-standard chroma, Sync, RGB processors.

Mask ROM: TMPA8873CMANG (ROM size: 32k)
Mask ROM: TMPA8873CPANG (ROM size: 48k)
Mask ROM: TMPA8873CRANG (ROM size: 56k)
Mask ROM: TMPA8873CSANG (ROM size: 64k)
OTP ROM: TMPA8873PSANG (ROM size: 64k)



Weight: 8.85 g (typ.)

2. FEATURE

MCU

- ●High speed 8-bit CPU (TLCS-870/X series)
- ●Instruction execution time: 0.5 s (at 8 MHz)
- ●(TMPA8873CPANG)

48-Kbytes ROM, 2-Kbytes RAM

- ●ROM correction
- ●12 I/O ports
- ●14-bit PWM output 1 ch for a voltage synthesizer
- ●7-bit PWM output 1 channel
- ●8-bit A/D converter 3 ch for a touch-key input with key ON wake-up CIRCUIT
- ●Remote control signal preprocessor
- ●Two 16-bit internal timer/counter 2 ch
- ●Two 8-bit internal timer/counter 2 ch
- ●Time base timer, watchdog timer
- ●16 interrupt sources: external 5, internal 11

IIC bus interface (multi-master)

- ●STOP and IDLE power saving modes

CCD Decoder

- ●Digital data slicer for NTSC

OSD

- ●Clock generation for OSD display
- ●Clock generation for OSD display
- ●Font ROM characters: 384 characters
- ●Characters display: 32 columns × 12 lines
- ●Composition: 16 × 18 dots
- ●Size of character: 3 (line by line)
- ●Color of character: 8 (character by character)
- ●Display position: H 256/V 512 steps
- ●BOX function
- ●Fringing, smoothing, Italic, underline function
- ●Conform to CCD REGULATION
- ●Jitter elimination

TV Processor

IF

- ●Integrated PIF VCO aligned automatically
- ●Negative demodulation PIF
- ●Multi-frequency SIF demodulator without external Tank-coil
- ●SIF BPF built-in
- ●SIF Trap filter built in

Video

- ●Integrated chroma traps
- ●Black stretch
- ●Y-gamma

Chroma

- ●Integrated chroma BPFs
- ●PAL/NTSC demodulation

RGB/Base-Band

- ●Integrated 1 H base-band delay line
- ●Base-band TINT control
- ●Internal OSD interface
- ●Half-tone and transparent for OSD
- ●External YCbCr interface for DVD
- ●RGB cut-off/drive controls by bus
- ●ABCL (ABL and ACL combined)

Sync.

- ●Integrated f_H × 640 VCO
- ●DC coupled vertical ramp output (single)
- ●Sync output

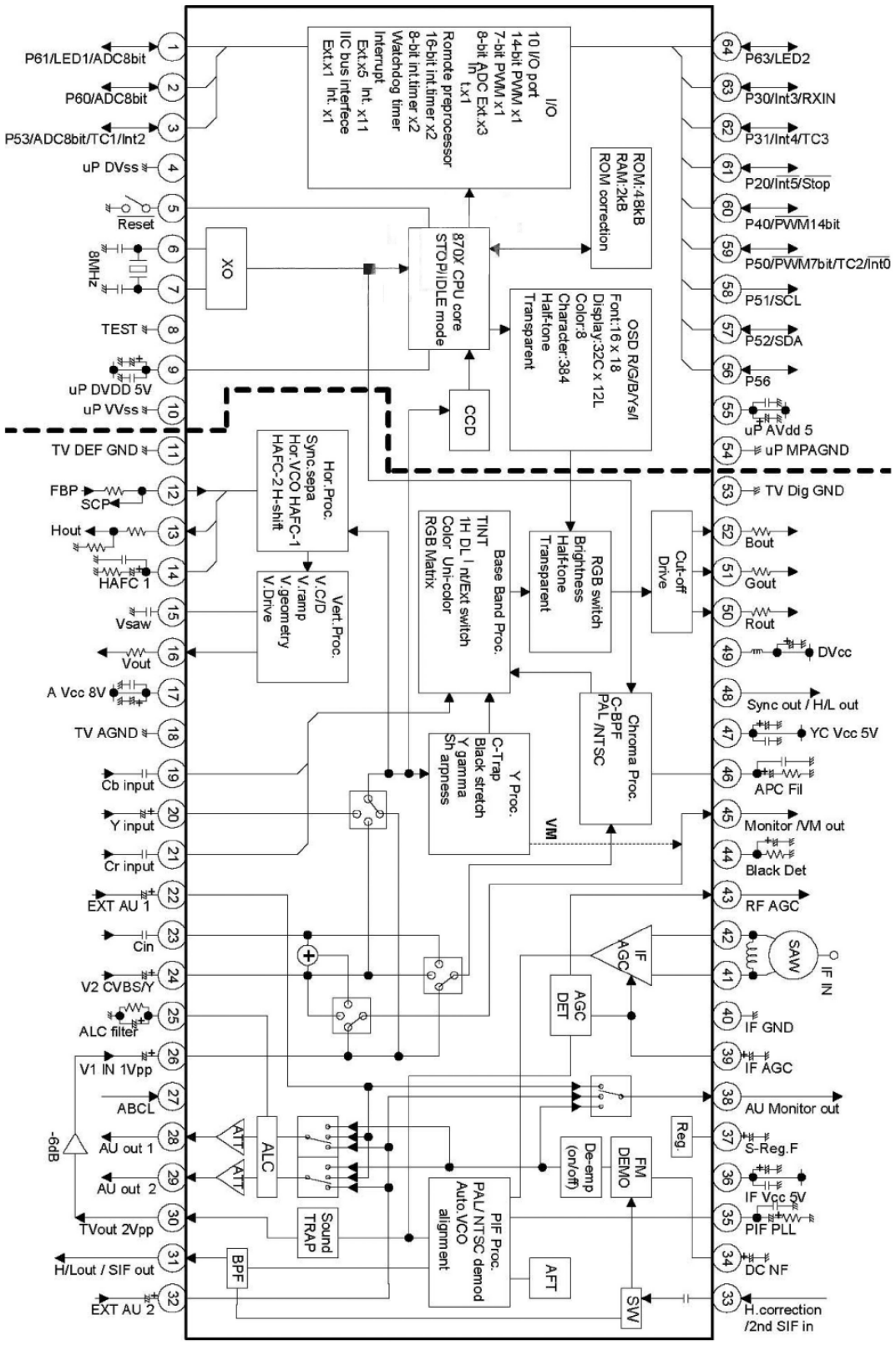
AV Switch

- ●2 for video
- ●2 for audio(mono)

or 1 for audio (Stereo, 2ch ATT), controlled by IIC b

- ●ALC (Auto-Audio Level Control)

3. BLOCK DIAGRAM



4.Basic Structure

1. Internal Connections

TMPA8873 has two pieces of IC chip in one package, using Multi-Chip-Package (MCP) technology. One is a micro controller (MCU) and the other one is a signal processor (SP) for a color TV. There are some internal connections between these two ICs for handling below signals.

No.	Signal Name	Direction	Description
1	SCL	M to S	Internal IIC bus SCL
2	SDA	Bi-direction	Internal IIC bus SDA
3	OSD R	M to S	OSD signal connection
4	OSD G	M to S	OSD signal connection
5	OSD B	M to S	OSD signal connection
6	OSD Y/BL	M to S	OSD display control
7	OSD I, CS OUT	M to S	OSD half-tone control/Test pattern signal
8	C-Video	S to M	Composite video signal from internal video switch, for CCD
9	C-Sync	S to M	Composite sync. Signal from sync. Separator, for CCD
10	HD	S to M	Horizontal timing pulse regenerated from FBP, for OSD
11	VD	S to M	Vertical timing pulse from sync. Separator, for OSD
12	CLK	M to S	8 MHz clock
13	AVDD	M to S	Reference voltage for C-Video interface
14	ADC	S to M	A/D converter monitoring RF-AGC, R-Y and B-Y

Functions of SP from MCU are controllable through the IIC bus of the internal connections.

2. Power Supply

TMPA8873 has some power supplies and GND pins. Power supplies related MCU must be applied at the first. Power supplies for H.VCC and TV D.VCC are the second with at least 100 ms delay after MCU power ON. The other power supplies are the last, which are recommended to be supplied from a regulator circuit using FBP.

3. Crystal Resonator

TMPA8873 requires only one crystal resonator, in stead that a conventional two-chip solution requires two resonators at least, one for MCU and the other one for SP. An oscillation clock with the crystal resonator of TMPA8873 is supplied for MCU operation, PIF VCO automatic alignment, alignment free AFT, chroma demodulation and horizontal oscillation. The oscillation frequency is very important so that those of functions work properly, so that designing the oscillation frequency
accurately is required. The spec of crystal is recommended to be within

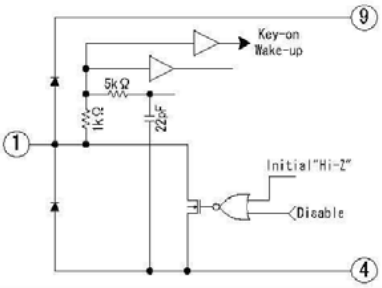
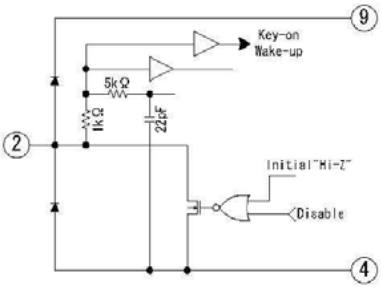
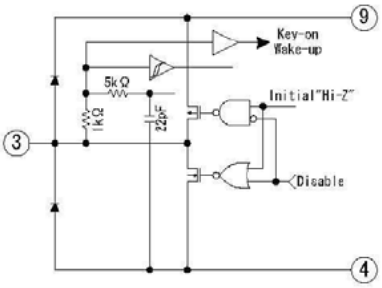
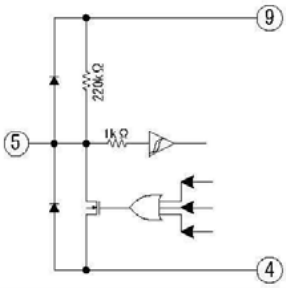
fosc: 8 MHz +/−20 ppm

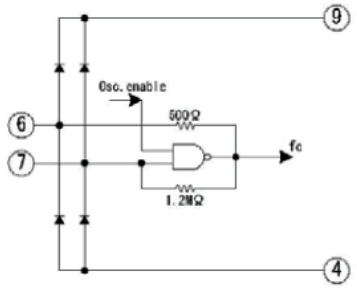
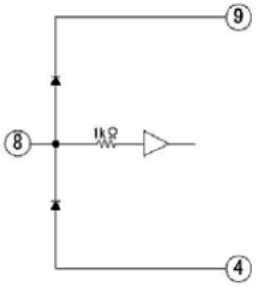
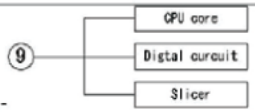
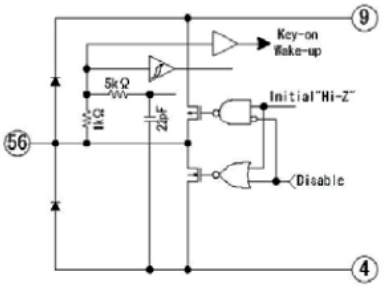
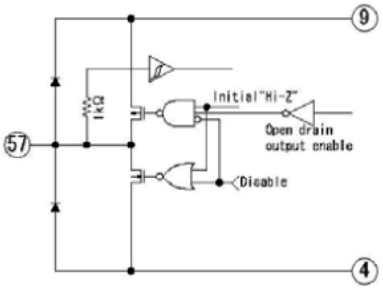
ftemp: 8 MHz +/−40 ppm (−20°C to +65°C)

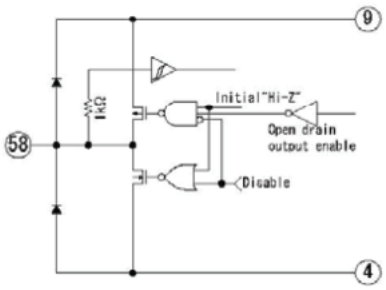
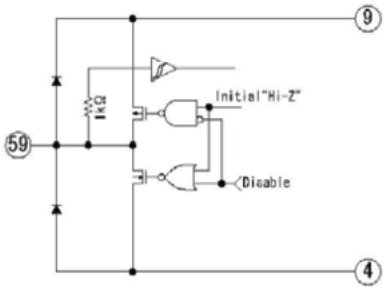
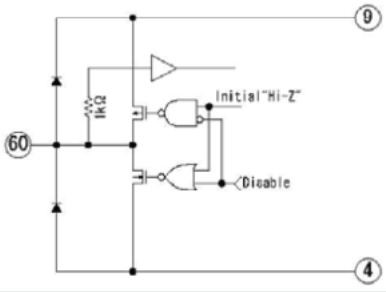
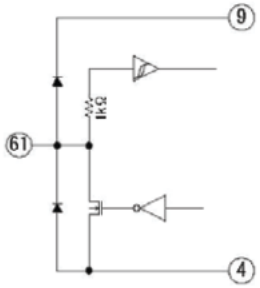
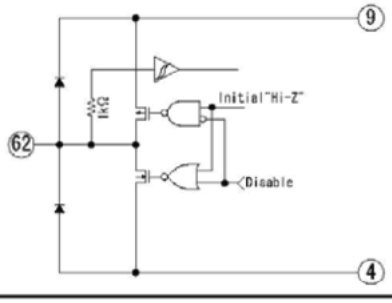
While RESET of MCU is active, the MCU function stops. Hardware and software initialization sequence including power supplies control is required, because status of any hardware after the RESET period is unknown especially horizontal oscillator which is a very basic timing generator of SP operation.

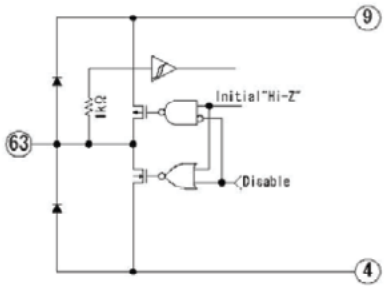
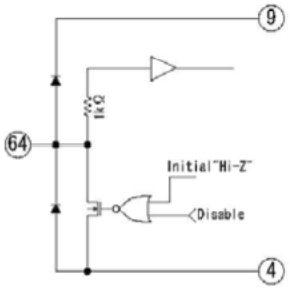
5. TERMINAL INTERFACE

MCU BLOCK

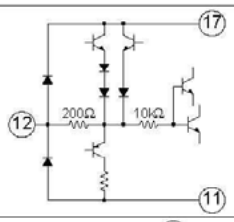
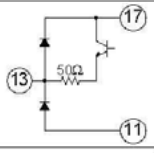
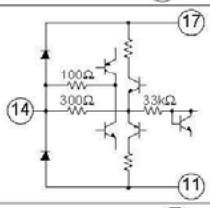
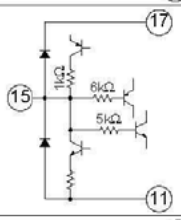
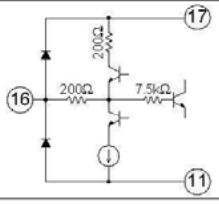
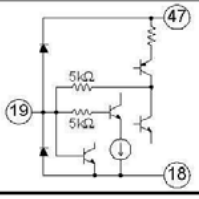
Pin No.	Pin Name	I/O	Function	Interface Circuit
1	P61 (/KWU5) (AIN5) (LED1)	I/O (Input) (Input) (Output)	Key on wake up input A/D converter analog input LED output	
2	P60 (/KWU4) (AIN4)	I/O (Input) (Input)	Key on wake up input A/D converter analog input	
3	P53 (/KWU0) (AIN0) (TC1) (INT2) (SCK1)	I/O (Input) (Input) (Input) (Input) (I/O)	Key on wake up input A/D converter analog input Timer/counter input External interrupt input SIO serial clock input / output	
4	up DVss	Power Supply	GND	—
5	Reset	I/O	Reset signal input or watchdog timer output Address trap reset output System clock reset output	

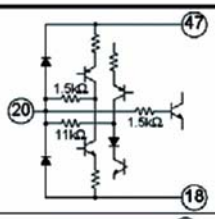
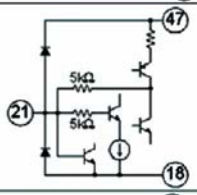
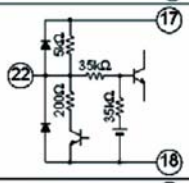
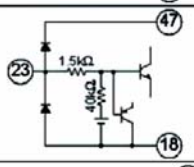
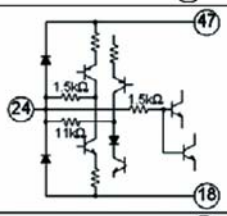
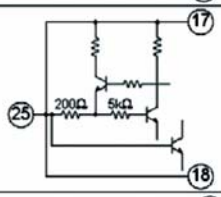
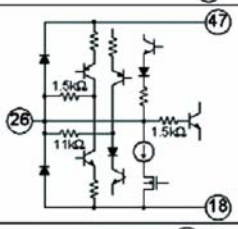
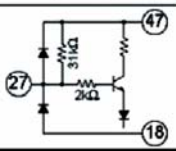
Pin No.	Pin Name	I/O	Function	Interface Circuit
6 7	Xout Xin	Output Input	X'tal connecting pins	
8	TEST	Input	Test pin for out-going test	
9	up DVdd	Power Supply	Vdd Supply 5V	
10	up VVss	Power Supply	GND for Slicer circuit	—
54	up AGND	Power Supply	GND for Oscillator circuit	—
55	up AVdd	Power Supply	Vdd for Oscillator circuit Supply 5V	—
56	P56	I/O		
57	P52 (SDA) (SO1)	I/O (I/O) (Output)	IIC bus serial data input / output SIO serial data output	

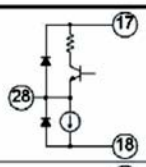
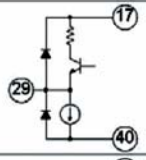
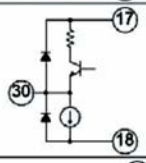
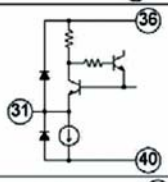
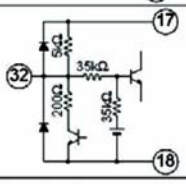
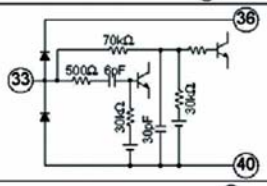
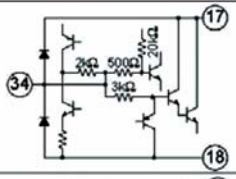
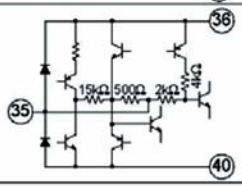
Pin No.	Pin Name	I/O	Function	Interface Circuit
58	P51 (SCL) (SI1)	I/O (I/O) (Input)	IIC bus serial clock input / output SIO serial data input	
59	P50 (/PWM8) (TC2) (INT0)	I/O (Output) (Input) (Input)	7-bit D/A conversion (PWM) output Timer/Counter input External interrupt input	
60	P40 (/PWM0)	I/O (Output)	14/12-bit D/A conversion (PWM) output	
61	P20 (/INT5) (/STOP)	I/O (Input) (Input)	External interrupt input STOP mode release signal input	
62	P31 (INT4) (TC3)	I/O (Input) (Input)	External interrupt input Timer/Counter input	

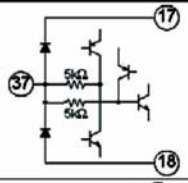
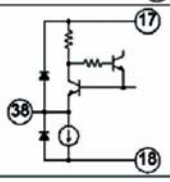
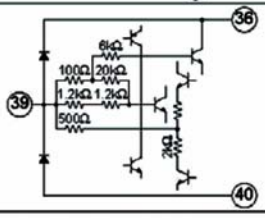
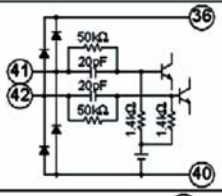
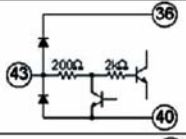
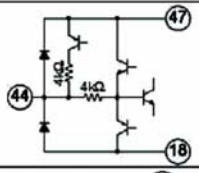
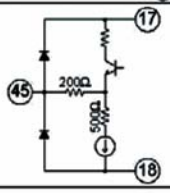
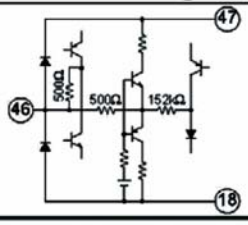
Pin No.	Pin Name	I/O	Function	Interface Circuit
63	P30 (INT3) (RXIN)	I/O (Input) (Input)	External interrupt input Remote control signal preprocessor input	
64	P63 (LED2)	I/O (Output)	LED output	

SIGNAL PROCESSOR BLOCK

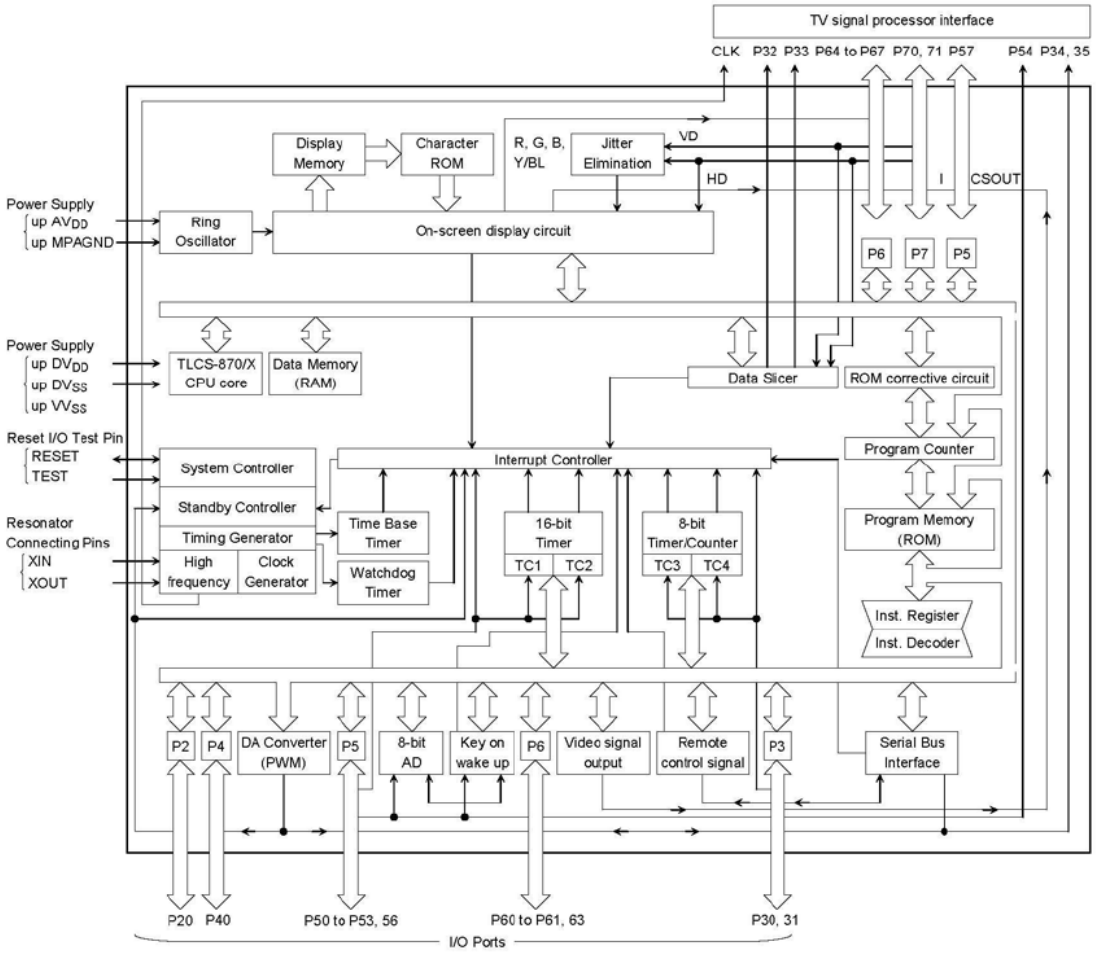
Pin No.	Pin Name	Function	Interface Circuit	I/O Signal
11	TV DEF AGND	GND terminal for TV DEF block.	—	—
12	FBP in	Input terminal for FBP.		
13	H out	Output terminal for Horizontal driving pulse.		
14	HAFC 1	Terminal to be connected capacitor for H AFC filter. This terminal voltage controls H VCO frequency.		
15	V saw	Terminal to be connected capacitor to generate V saw signal. V saw amplitude is kept constant by V AGC function.		
16	V out	Output terminal for Vertical driving pulse.		
17	AVcc 8V	Vcc terminal for DEF, RGB, Audio out and PIF out circuit. Supply 8V.	—	—
18	TV A GND	GND terminal for TV block.	—	—
19	Cb in	Input terminal for Cb signal.		

Pin No.	Pin Name	Function	Interface Circuit	Signal
20	Y in	Input terminal for Y signal.		
21	Cr in	Input terminal for Cr signal.		
22	Ext Au1	Input terminal for Audio signal 1.		
23	C in	Input terminal for Chroma signal.		
24	V2 in	Input terminal for Video signal.		
25	ALC filter	Terminal to be connected capacitor for ALC (Audio Level Control).		
26	V1 in	Input terminal for Video signal. (Input level = 1 Vp-p)		
27	ABCL	Input terminal for ABL/ACL control.		

Pin No.	Pin Name	Function	Interface Circuit	I/O Signal
28	Au out 1	Output terminal 1 for Audio signal.		
29	Au out 2	Output terminal 2 for Audio signal.		
30	TV out	Output terminal for detected PIF signal.		
31	1bit DAC /SIF out	Output terminal for 1bit DAC or detected SIF signal.		
32	Ext Au2 in	Input terminal for Audio signal 1.		
33	H correc / SIF in	Input terminal for H correction and 2nd SIF.		
34	DC NF	Terminal to be connected capacitor for DC Negative Feedback from SIF Det output.		
35	PIF PLL	Terminal to be connected with loop filter for PIF PLL. This terminal voltage is controlled PIF VCO frequency.		
36	IF Vcc 5V	Vcc terminal for IF circuit. Supply 5V.		—

Pin No.	Pin Name	Function	Interface Circuit	I/O Signal
37	Reg Fil	Terminal to be connected capacitor for stabilizing internal bias.		
38	AUDIO Monitor out	Output terminal for External audio signal or TV audio signal selected by BUS (Audio SW).		
39	IF AGC	Terminal to be connected with IF AGC filter.		
40	IF GND	GND terminal for IF circuit.		—
41 42	IF in	Input terminals for IF signals. Pin41 and Pin42 are both input poles of differential amplifier.		
43	RF AGC	Output terminal for RF AGC control level.		
44	Black Det	Terminal to be connected with Black Det filter for black stretch.		
45	SVM / Monitor	Output terminal for monitor function. Also output terminal for SVM signal. Selectable through IIC bus		
46	APC filter	Terminal to be connected with APC filter for Chroma demodulation. This terminal voltage controls frequency of VCXO.		

Microcontrollers Descriptions (MROM version: TMPA8873CMANG / CPANG / CRANG /CSANG)



2. TFA9842AJ

2-channel audio amplifier with volume control (SE: 1 W to 7.5 W)

1. General Description

The TFA9842AJ contains two identical audio power amplifiers. The TFA9842AJ can be used as two Single-Ended (SE) channels with a volume control. The maximum gain is 26 dB.

The TFA9842AJ comes in a 9-pin DIL-bent-SIL (DBS9P) power package. The TFA9842AJ is pin compatible with the TFA9843AJ, TFA9843(B)J, TFA9842(B)J and TFA9841J. The difference between the TFA9843AJ and the TFA9843(B)J,TFA9842(B)J, TFA9841J is the functionality of pin 7. The TFA9843AJ has a Volume Control (VC) on pin 7. The TFA9843(B)J, TFA9842(B)J and TFA9841J have a mode select (Mode) on pin 7. The TFA9842AJ contains a unique protection circuit that is solely based on multiple temperature measurements inside the chip. This gives maximum output power for all supply voltages and load conditions with no unnecessary audio holes. Almost any supply voltage and load impedance combination can be made as long as thermal boundary conditions (number of channels used, external heat sink and ambient temperature) allow it.

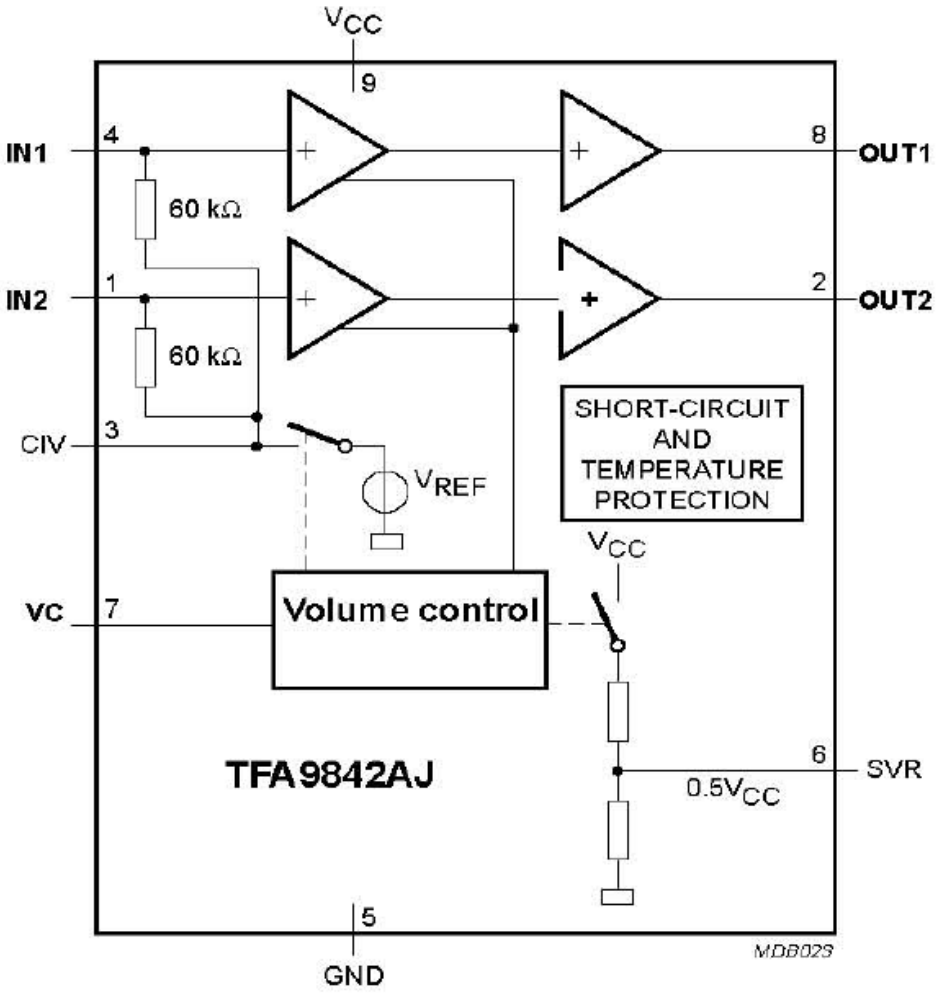
2. Features

■2 Channel SE: 1 W to 7.5 W operation possibility
■Soft clipping
■Input clamps
■Volume control
■Standby and mute mode
■No on/off switching plops
■Low standby current
■High supply voltage ripple rejection
■Outputs short-circuit protected to ground, supply and across the load
■Thermally protected
■Pin compatible with the TFA9843AJ, TFA9843(B)J, TFA9842(B)J, TFA9841J.

3. Applications

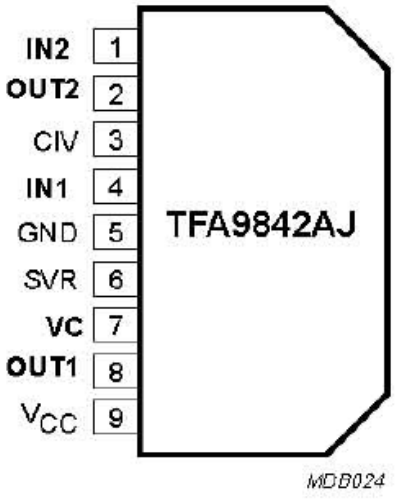
■CRT TV, LCD TV
■Monitors
■PC speakers
■Boom box
■Mini and micro audio receivers.

3. Block Diagram



4. Pinning information

4.1 Pinning



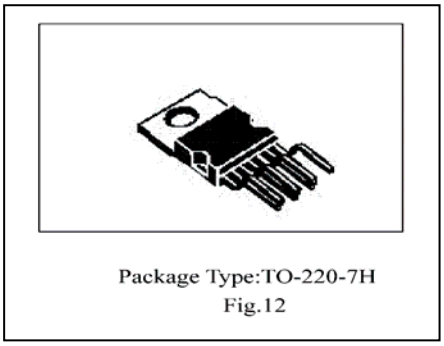
4.2 Pin Description

Symbol	Pin	Description
IN2	1	input 2
OUT2	2	loudspeaker terminal 2
CIV	3	common input voltage decoupling
IN1	4	input 1
GND	5	ground
SVR	6	half supply voltage decoupling (ripple rejection)
VC	7	volume control input (standby, mute and volume control)
OUT1	8	loudspeaker terminal 1
V_{CC}	9	supply voltage

4. VERTICAL SCAN OUTPUT STAGE CIRCUIT LA78040/LA78041

Both LA78040/LA78041 are vertical scan output stage power amplifiers. But there is a little bit difference between the two amplifiers, that is, LA78040 has supply voltage of 24V and output current of 1.8AP-P while LA78041 has supply voltage of 30V and output current of 2.2AP-P. LA78040/LA78041 (N602)

Vertical Deflection Output Circuit



1) Features

Low power dissipation due to built-in pump-up circuit Vertical output circuit Thermal protection circuit built in Excellent crossover characteristics DC coupling possible

2) Block Diagram

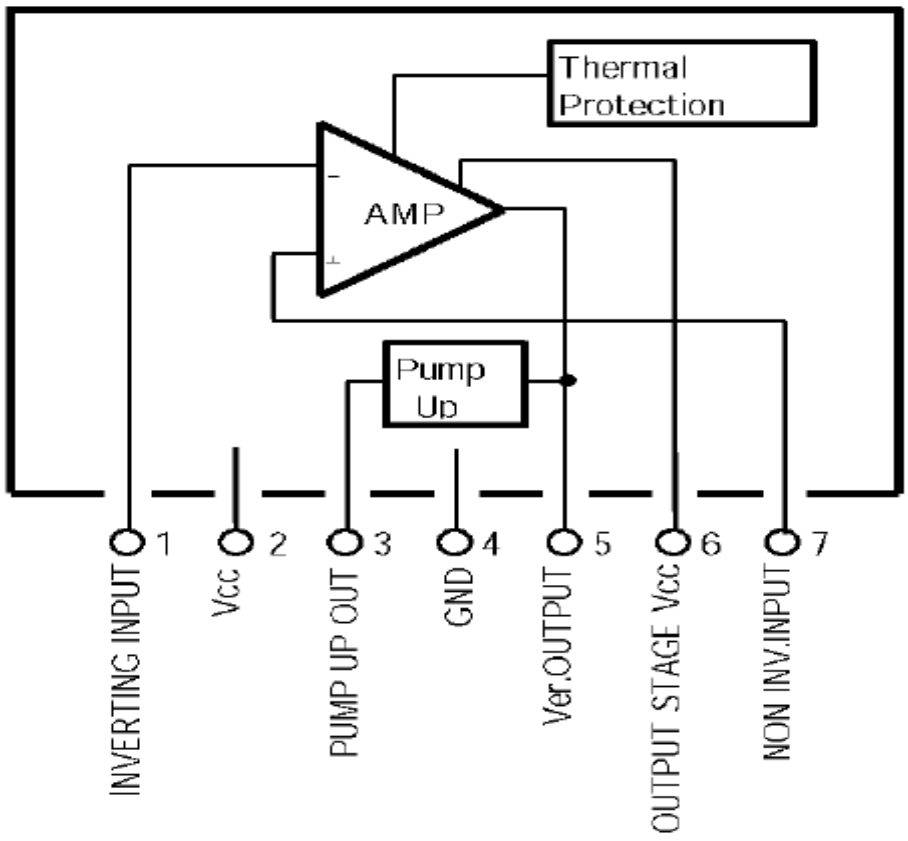


Fig. 13 Block Diagram

5. EEPROM AT24C04/08/16

1) Features

Low-voltage and Standard-voltage Operation
-2.7 (Vcc=2.7V to 5.5V)

-1.8 (Vcc=1.8V to 5.5V)

Internally Organized 128x8(1K), 256x8 (2K), 512x8 (4K),
1024x8 (8K) or 2048x8 (16K)

2-wire Serial Interface

Schmitt Trigger, Filtered Inputs for Noise Suppression Bi-directional Data Transfer Protocol

100kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility Write Protect Pin for Hardware Data Protection

8-byte Page (1K, 2K), 16-byte Page (4K, 8K, 16K) Write Modes Partial Page Writes are Allowed

Self-timed Write Cycle (10 ms max) High-reliability

-Endurance: 1 Million Write Cycles - Data Retention: 100 Years

Automotive Grade and Extended Temperature Devices Available 8-lead PDIP, 8-lead JEDEC SOIC, 8-lead MAP and 8-lead TSSOP Package 2-wire

Serial EEPROM

AT24C01A	1K (128 x 8)
AT24C02	2K (256 x 8)
AT24C04	4K (512 x 8)
AT24C08	8K (1024 x 8)
T24C16	6K (2048 x 8)

2) Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read-only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits
each. The device is optimized for use in many industrial and commercial applications where low-power and low-voltage operations are essential. The AT24C01A/02/04/08/16 is available in space-saving 8-pin PDIP, 8-lead JEDEC SOIC, 8-lead MAP and 8-lead TSSOP packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 2.7V (2.7V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

3) Pin Configuration

Table 12

Pin Name	Function
A0-A2	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

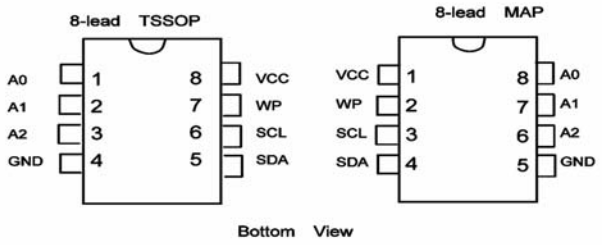


Fig. 14

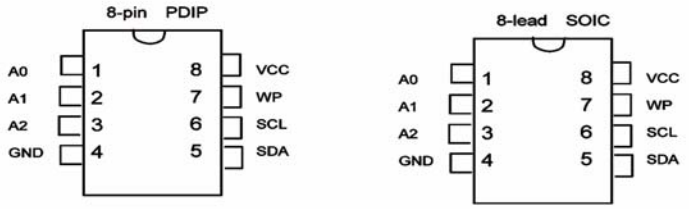


Fig. 15

4) Pin Description

SERIAL CLOCK (SCL): The SCL input is used to positive edge clock data into each EEPROM device and negative edge clock data out of each device.

SERIAL DATA (SDA): The SDA pin is bi-directional for serial data transfer. This pin is open-drain driven and may be wire-ORed with any number of other open-drain or open-collector devices.

DEVICE/PAGE ADDRESSES (A2, A1, A0): The A2, A1 and A0 pins are device address inputs that are hard wired for the AT24C01A and the AT24C02. As many as eight 1K/2K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section).

The AT24C04 uses the A2 and A1 inputs for hard wire addressing and a total of four 4K devices may be addressed on a single bus system. The A0 pin is a no connect.

The AT24C08 only uses the A2 input for hardwire addressing and a total of two 8K devices may be addressed on a single bus system. The A0 and A1 pins are no connects.

The AT24C16 does not use the device address pins, which limits the number of devices on a single bus to one. The A0, A1 and A2 pins are no connects.

WRITE PROTECT (WP): The AT24C01A/02/04/16 has a Write Protect pin that provides hardware data protection.

The Write Protect pin allows normal read/write operations when connected to ground (GND). When the Write Protect pin is connected to Vcc, the write protection feature is enabled and operates as shown in table 14.

Table 13

WP PIN Status	Part of the Array Protected				
	24C01A	24C02	24C04	24C08	24C16
At Vcc	Full (1K) Array	Full (2K) Array	Full (4K) Array	Normal Read / Write Operation	Upper Half (8K) Array
At GND	Normal Read / Write Operation				

5) Memory Organization

AT24C01A, 1K SERIAL EEPROM: Internally organized with 16 pages of 8 bytes each, the 1K requires a 7-bit data word address for random word addressing.

AT24C02, 2K SERIAL EEPROM: Internally organized with 32 pages of 8 bytes each, the 2K requires an 8-bit data word address for random word addressing.

AT24C04, 4K SERIAL EEPROM: Internally organized with 32 pages of 16 bytes each, the 4K requires a 9-bit data word address for random word addressing.

AT24C08, 8K SERIAL EEPROM: Internally organized with 64 pages of 16 bytes each, the 8K requires a 10-bit data word address for random word addressing.

AT24C16, 16K SERIAL EEPROM: Internally organized with 128 pages of 16 bytes each, the 16K requires an 11-bit data word address for random word addressing.

6) Block Diagram

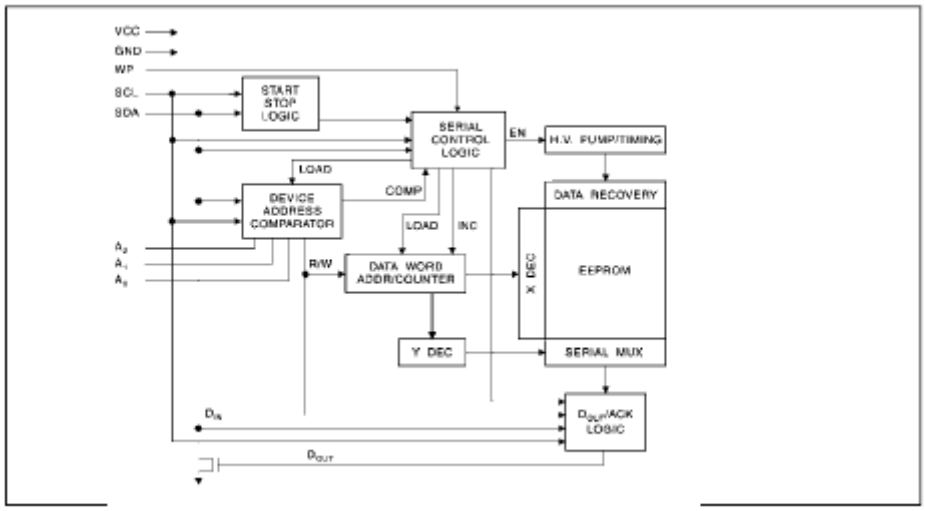


Fig. 16

7) Refer to Table 21 about Functions and Data of the IC's Pins.

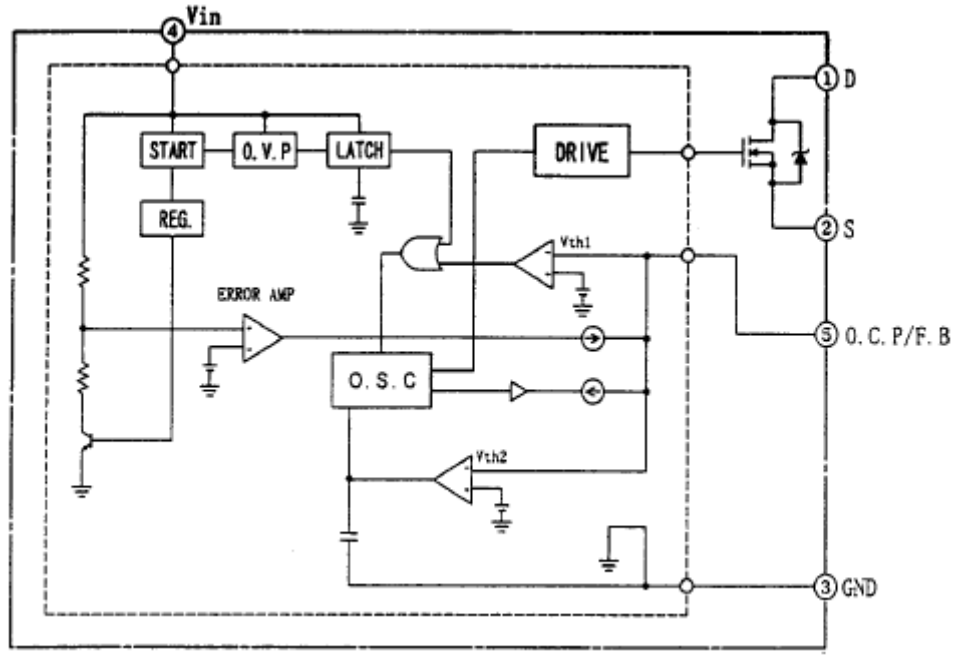
7. SWITCH-MODE POWER SUPPLY IC STRG5653/G8656

1). General Description

The STRG5653/G8656 are part of the STRG5600/G8600 series thick-film ICs for switch-mode power supply incorporating power MOSFET with a high-precise error amplifier. The ICs feature fewer external components, small-size and standard power supply.

The series STR-G8600 use Chip on Chip technology with the same operation principle as STR-G5600. Pin configuration, function and threshold of STR-G8600 are compatible with those of STR-G5600.

2) Block Diagram



3) Function of Terminal

Table 15

Terminal No.	Symbols	Description	Functions
1	D	Drain Terminal	MOS FET drain
2	S	Source Terminal	MOS FET source
3	GND	Ground Terminal	Ground
4	VIN	Power supply Terminal	Input of power supply for control signals
5	O.C.P/F.B	Overcurrent/Feedback Terminal	Input of overcurrent detection signal and constant voltage signals

4) Refer to table 22 about Functions and Data of the IC's Pins

SERVICE DATA OF KEY ICs

Table 16 Ground Resistance of TMPA8873 Pins

Pin No	1	2	3	4	5	6
Resistance	>2000 KΩ	>2000 KΩ	-	0	5.6 KΩ	>2000 KΩ
Pin No	7	8	9	10	11	12
Resistance	>2000 KΩ	0	>2000 KΩ	0	0	>2000 KΩ
Pin No	13	14	15	16	17	18
Resistance	-	>2000 KΩ	>2000 KΩ	18.6 KΩ	10.6 KΩ	0
Pin No	19	20	21	22	23	24
Resistance	>2000 KΩ	>2000 KΩ	>2000 KΩ	107 KΩ	93.2 KΩ	3.2 KΩ
Pin No	25	26	27	28	29	30
Resistance	0.56 KΩ	24.70 KΩ	16.65 KΩ	22.04 KΩ	0.3 KΩ	3.27 KΩ
Pin No	31	32	33	34	35	36
Resistance	3.2 KΩ	107 KΩ	>2000 KΩ	>2000 KΩ	1500 KΩ	1.9 KΩ
Pin No	37	38	39	40	41	42
Resistance	>2000 KΩ	100 KΩ	>2000 KΩ	0	56 KΩ	56 KΩ
Pin No	43	44	45	46	47	48
Resistance	14.5 KΩ	220 KΩ	3.2 KΩ	>2000 KΩ	1.9 KΩ	-
Pin No	49	50	51	52	53	54
Resistance	0.7 KΩ	69 KΩ	120 KΩ	69 KΩ	0	-
Pin No	55	56	57	58	59	60
Resistance	-	-	-	-	-	>2000 KΩ
Pin No	61	62	63	64		
Resistance	>2000 KΩ	-	>2000 KΩ	-		

Note: Measured when Power-off

Table 17 Operating Voltage of TMPA8873(N202)'s Pins

Pin No	1	2	3	4	5	6
Voltage (V)	0V	0V	5V	GND	5V	2.3V
Pin No	7	8	9	10	11	12
Voltage (V)	2.1V	GND	5V	GND	GND	1.1V
Pin No	13	14	15	16	17	18
Voltage (V)	2.2V	5.9V	4.1V	4.7V	8.3V	0V
Pin No	19	20	21	22	23	24
Voltage (V)	3.2V	2.4V	3.2V	3.8V	2.5V	2.5V
Pin No	25	26	27	28	29	30
Voltage (V)	0V	2.7V	4.5V	3.2V	3.2V	3.0V
Pin No	31	32	33	34	35	36
Voltage (V)	1.5V	3.9V	3.0V	3.1V	2.4V	5V
Pin No	37	38	39	40	41	42
Voltage (V)	2.0V	3.9V	3.0V	GND	0V	2.0V
Pin No	43	44	45	46	47	48
Voltage (V)	1.4V	2.6V	2.8V	2.3V	5.0V	4.5V
Pin No	49	50	51	52	53	54
Voltage (V)	3.4V	2.5V	2.5V	2.5V	GND	GND
Pin No	55	56	57	58	59	60
Voltage (V)	5V	0V	5V	5V	0V	5.0V
Pin No	61	62	63	64		
Voltage (V)	0V	4.5V	0.9V	0V		

Table 18 Functions and Service Data TFA9842J's Pins

Pin No.	Symbol	Functions Description	Digital Multimeter	
			Reference Voltage(V)	Positive Resistance(20KΩ)
1	IN2	Input 2	4.7	18.2MΩ
2	OUT2	Loudspeaker terminal 2	9.0	28KΩ
3	CIV	Common input voltage decoupling	4.7	280KΩ
4	IN1	Input 2	4.7	18.2MΩ
5	GND	ground	0	0
6	SVR	Half supply voltage decoupling(ripple rejection)	10.4	-
7	VC	Volume control input(standby, mute and volume control)	20	11KΩ
8	OUT1	Loudspeaker terminal 1	9	-
9	VCC	supply voltage	20	1KΩ

Table 20 Functions and Service Data LA78040's Pins

Pin No.	Function Description	GDM8145 Multimeter		
		Voltage of Pin (V)	Ground Resistance (KΩ)	
			Measure with red probe while grounding black probe.	Measure with black probe while grounding red probe.
1	INVERTING INPUT	2.04	-	2.62
2	VCC	25.02	-	1.87
3	Pump UP OUT	1.76	-	2.68
4	GND	0	0	0
5	Ver. OUTPUT	15.32	-	2.26
6	OUTPUT STAGE Vcc	25.20	∞	2.35
7	NON INV. INPUT	2.04	3.25	2.5

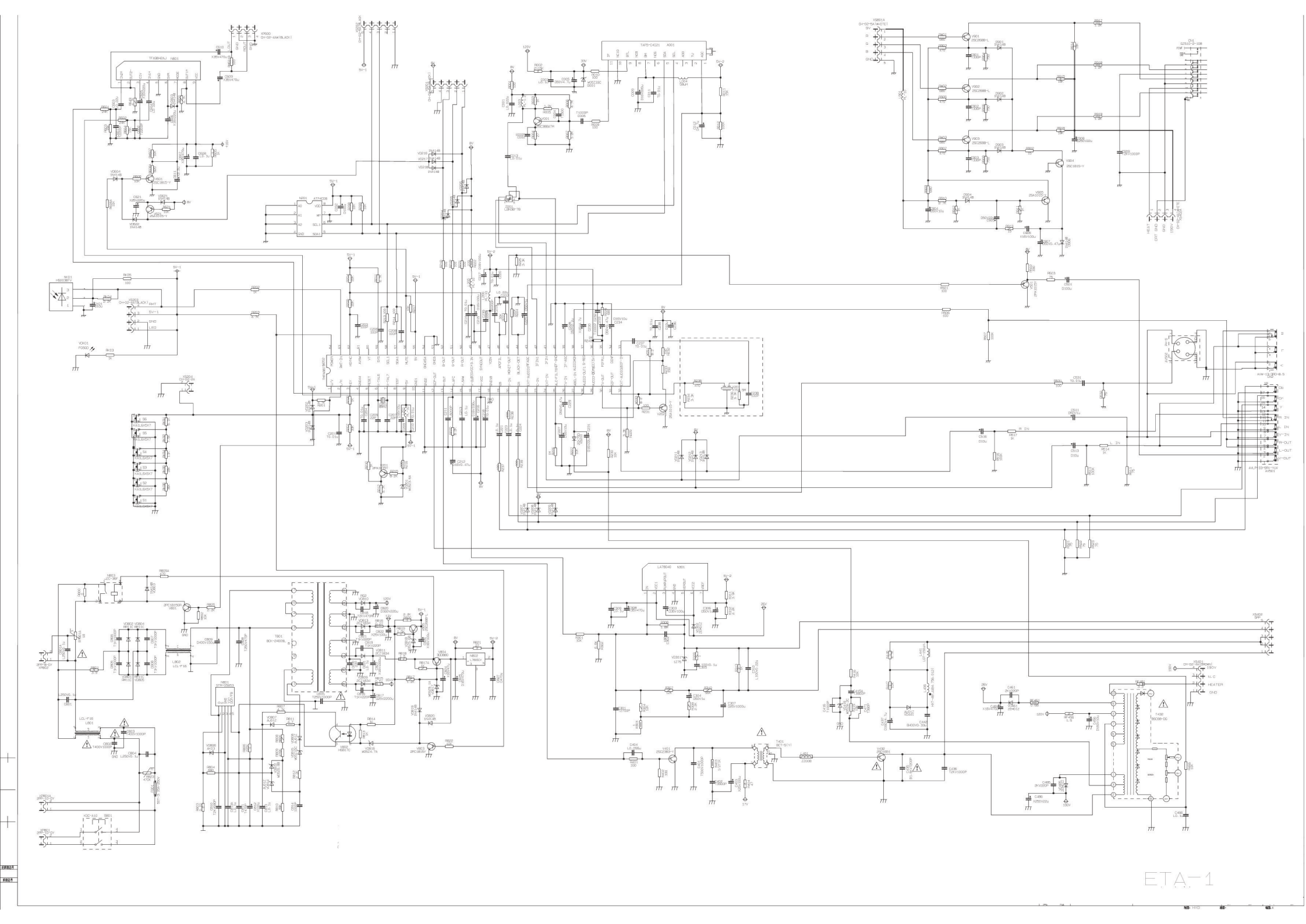
Table 21 Functions and Service Data of AT24C08 / 16 Pins

Pin No.	Function Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20KΩ)	Negative Resistance (20KΩ)
1	Address input	0	0	0
2	Address input	0	0	0
3	Address input	0	0	0
4	Common ground	0	0	0
5	Clock line	5	13.79	11.22
6	Data line	5	13.70	13.13
7	PW write protect	0	0	0
8	Supply voltage	5	3.79	3.78

Table 22 Functions and Service Data of STR-G5653'S Pins

Pin No.	Functions Description	Digital Multimeter		
		Reference Voltage (V)	Positive Resistance (20K Ω)	Negative Resistance (20KΩ)
1	Drain terminal	288	∞	∞
2	Source terminal	0.028	0	0
3	Ground terminal	0	0	0
4	Power supply terminal	32.24	∞	1.838
5	Overcurrent/Freedback terminal	1.85	0.68	0.68

APPENDIX


ETA-1

REPLACEMENT PARTS LIST

PART CODE	PART NAME	SPECIFICATION	QTY	LOCATION			
883370281G007	POWER SW. CAP	JUC8.337.281-G007	1				
	FUNCTION KEY		1				
54111A04180	POWER SWITCH	KDC-A04-MU171	1	S801			
54111A04180	POWER SWITCH	KDC-A04(30)					
54111A04180	POWER SWITCH	PS5E-A-T1					
56281310080	SPEAKER	YDT59-A3-10W-8Ω	2				
8475900210B	DEGAUSSING COIL	XC-21F2	1				
681C21F1CH3	21" CRT	54SX538Y22-DC01	1				
	FRONT PANEL		1				
8864001520C	LENS	JUC8.640.152	1				
50990011200	REMOTE CONTROLLER	ACH-T-1	1				
8782000060G	MAIN PCB	JUG7.820.006	1				
51113681JU0	CARBON RES.	RT13-0.166W-680ΩJ	1	R804			
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	2	R813	R814		
51113152JU0	CARBON RES.	RT13-0.166W-1.5KΩJ	1	R819			
51113222JU0	CARBON RES.	RT13-0.166W-2.2KΩJ	1	R812			
51113472JU0	CARBON RES.	RT13-0.166W-4.7KΩJ	1	R807			
51113103JU0	CARBON RES.	RT13-0.166W-10KΩJ	1	R822			
50620071780	CARBON RES.	RT13-0.166W-39KΩJ	1	R810			
50620071650	CARBON RES.	RT13-0.166W-270KΩJ	1	R809			
50620071200	CARBON RES.	RT14-0.25W-1.2KΩJ	1	R817			
50620071350	CARBON RES.	RT14-0.25W-560KΩJ	1	R808			
513154P7J40	M. OXIDE FILM RES.	RY21-0.5W-4.7ΩJ	1	R811			
50620101590	M. OXIDE FILM RES.	RY21-1W-220KΩJ	1	R806			
50620102710	M. OXIDE FILM RES.	RY21-2W-0.27ΩJ	1	R803			
50620050240	FUSE RES.	RF10-0.5W-0.27ΩJ	1	R816			
51516P47J10	FUSE RES.	RF10-1W-0.47ΩJ	2	R815	R818		
50620080290	COIL RES.	RXG6-H2-10W-2.2ΩJ	1	R801			
51C20090M00	THERMAL RES.	MZ73-9ΩM	1	RT801A			
50640021950	CERAMIC CAP.	CC1-63V-10C-SL-470PFJ	1	C811			
52532102K10	CERAMIC CAP.	CT1-63V-06C-2B4-1000PFK	1	C814			
50640021630	CERAMIC CAP.	CT81-250VAC-2B4-470PFK-Y1	2	C802	C803		
50640063120	CERAMIC CAP.	CD95-B2GA471KYHS					
50640022370	CERAMIC CAP.	CT7-250VAC-2B4-470PFK-Y1					
5254F102M10	CERAMIC CAP.	CT81-250VAC-2E4-1000PFM-Y1	1	C815			
5254F102M10	CERAMIC CAP.	CT7-250VAC-2E4-1000PFM-Y1					
5254F102M10	CERAMIC CAP.	CD85-E2GA102MYHS					
52582102M30	CERAMIC CAP.	CT81-1KV-10C-2B4-1000PFM	4	C805	C806	C807	C808
52592471K30	CERAMIC CAP.	CT81-2KV-10C-2B4-470PFK	1	C818			
50640022840	CERAMIC CAP.	CT1-500V-06C-2B4-470PFK	3	C816	C819	C821	
52592681K30	CERAMIC CAP.	CT81-2KV-12C-2B4-680PFK	1	C810			
5246Q104KB0	POLYPROPYLENE CAP.	CBB62-250VAC-0.1μFK	2	C801	C804		
52367104J10	MYLAR CAP.	CL21X-50V-0.1μFJ	1	C813			
52613101M11	ELECTROLYTIC CAP.	CD110X-16V-100μFM	1	C826			
52613471M11	ELECTROLYTIC CAP.	CD110X-16V-470μFM	2	C825	C827		
52614221M11	ELECTROLYTIC CAP.	CD110X-25V-220μFM	1	C822			
50640062160	ELECTROLYTIC CAP.	CD110X-25V-1000μFM	1	C823			
52616102M11	ELECTROLYTIC CAP.	CD110X-35V-1000μFM	1	C817			
52617470M11	ELECTROLYTIC CAP.	CD110X-50V-47μFM	1	C824			
52617101M11	ELECTROLYTIC CAP.	CD110X-50V-100μFM	1	C812			
50640062370	ELECTROLYTIC CAP.	CD288-160V-220μFM	1	C820			
50640062400	ELECTROLYTIC CAP.	CD293/289-450V-220μFM	1	C809			
61411075DT0	DIODE	1N4148	1	VD819			
61212047AT5	DIODE ZENER	W05Z4.7A/GDZ4.7A	1	VD816			
61212056BT5	DIODE ZENER	W05Z5.6B/GDZ5.6B	2	VD818			
61212056B35	DIODE ZENER	W05Z5.6B/GDZ5.6B		VD812			
61212100BT5	DIODE ZENER	W05Z10B/GDZJ10B	1	VD817			
61212150BT5	DIODE ZENER	W05Z15B/GDZ15B	1	VD815			
61112183440	DIODE	2CZ1834	2	VD813	VD811		
50660091880	DIODE	HER205	1	VD809			
61100103020	DIODE	AK03	1	VD806			
61100111046	DIODE	AU01Z	3	VD807	VD808	VD814	
611308RG420	DIODE	RG4A	1	VD810			
61414540810	DIODE	1N5408	4	VD801	VD802	VD804	VD805
62118150Y16	AUDION	3DG1815-Y	1	V803			
62126880030	AUDION	3DA2688-L	1	V805			
62126880030	AUDION	2SC2688-L					
64408800Y10	AUDION	3DD880/3DD880A	1	V804			
64408800Y10	AUDION	2SD880-Y					
8475700020B	LINE FILTER	LCL-F16(JUB4.757.002)	1	L801			
8475700010B	LINE FILTER	LCL-F15(JUB4.757.001)	1	L802			
8472607070B	TRANSFORMER	BCK-23519L(JUB4.726.485)	1	T801			
50060010190	TRANSFORMER	BCK-35-0318					
50390070930	I.C	CW7805CS	1	N802			
50390020140	I.C	H11A817A	1	V802			
50390020150	I.C	HPC922					
50700010730	FUSE RES.	R/S/V/I50TT2.5AL250V(61802	1	F801			
59818033250	FUSE RES.	61802.5					

PART CODE	PART NAME	SPECIFICATION	QTY	LOCATION				
51113331JU0	CARBON RES.	RT13-0.166W-330ΩJ	2	R401	R402			
51113103JU0	CARBON RES.	RT13-0.166W-10KΩJ	2	R416	R466			
50620101330	M. OXIDE FILM RES.	RY21-0.5W-1KΩJ	1	R403				
50620102500	M. OXIDE FILM RES.	RY21-1W-15KΩJ	1	R415				
50620103000	M. OXIDE FILM RES.	RY21-3W-10KΩJ	1	R447				
50620102940	M. OXIDE FILM RES.	RY21-2W-47ΩJ	1	R404				
51516P27J70	FUSE RES.	RF10-1W-0.27ΩJ	1	RF461				
51517010J90	FUSE RES.	RF10-2W-1ΩJ	1	RF456				
52532392K10	CERAMIC CAP.	CT1-63V-10C-2B4-3900PFK	2	C402	C415A			
52542221K20	CERAMIC CAP.	CT1-500V-06C-2B4-220PFK	2	C461	C485			
52542102K10	CERAMIC CAP.	CT1-500V-10C-2B4-1000PFK	1	C401				
5236C104J10	MYLAR CAP.	CL21X-250V-0.1μFJ	1	C466				
52617470M11	ELECTROLYTIC CAP.	CD110X-50V-47μFM	1	C403				
52616471M11	ELECTROLYTIC CAP.	CD110X-35V-470μFM	1	C462				
50640062010	ELECTROLYTIC CAP.	CD110X-160V-4.7μFM	1	C437				
50640062630	ELECTROLYTIC CAP.	CD110X-160V-10μFM	1	C456				
50640062140	ELECTROLYTIC CAP.	CD110X-250V-22μFM	1	C486				
84739003100	TRANSFORMER	BCT-5(JU4.739.031)	1	T401				
611120RU251	DIODE	2CZRU2	1	VD461				
611120U1C45	DIODE	2CZEU1C	1	VD441				
50660091870	DIODE	2CZEU1C	1	VD485				
61212082CT5	DIODE ZENER	W05Z8.2C/GDZ8.2C	1	VD416				
62123830YT7	AUDION	3DG2383-Y	1	V401				
62423830O05	AUDION	3DG2383-0						
51113222JU0	CARBON RES.	RT13-0.166W-2.2KΩJ	2	R308	R312			
51113392JU0	CARBON RES.	RT13-0.166W-3.9KΩJ	1	R311				
50620101520	M. OXIDE FILM RES.	RY21-1W-1.5KΩJ	1	R315				
51113473JU0	CARBON RES.	RT13-0.166W-47KΩJ	1	R310				
50620071420	CARBON RES.	RT13-0.166W-1.8MΩJ	1	R306				
511241P5JT0	CARBON RES.	RT14-0.25W-1.5ΩJ	1	R309				
51224123J20	M. OXIDE FILM RES.	RJ14-0.25W-12KΩJ	1	R304				
50620030150	M. OXIDE FILM RES.	RJ14-0.25W-47KΩJ	1	R307				
5251C180J10	CERAMIC CAP.	CC1-63V-06C-C-18PFJ	1	C302				
50640023020	CERAMIC CAP.	CT1-63V-08C-2B4-2700PFK	1	C301				
52367104J10	MYLAR CAP.	CL21X-50V-0.1μFJ	1	C309				
52369104J10	MYLAR CAP.	CL21X-100V-0.1μFJ	1	C305				
50640062160	ELECTROLYTIC CAP.	CD110X-25V-1000μFM	1	C307				
52616471M11	ELECTROLYTIC CAP.	CD110X-35V-470μFM	1	C308				
52616101M11	ELECTROLYTIC CAP.	CD110X-35V-100μFM	1	C303				
52617010MV0	ELECTROLYTIC CAP.	CD110X-50V-1μFM	2	C306	C304			
611120RU251	DIODE	2CZRU2	1	VD302				
61216075075	DIODE ZENER	1Z75	1	VD301				
50620071680	CARBON RES.	RT13-0.166W-27ΩJ	1	R004				
51113101JU0	CARBON RES.	RT13-0.166W-100ΩJ	2	R001	R009			
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	1	R003				
51113122JU0	CARBON RES.	RT13-0.166W-1.2KΩJ	2	R005	R007			
51113472JU0	CARBON RES.	RT13-0.166W-4.7KΩJ	1	R006				
51113153JU0	CARBON RES.	RT13-0.166W-15KΩJ	1	R011				
51113104JU0	CARBON RES.	RT13-0.166W-100KΩJ	1	R012				
50620101880	M. OXIDE FILM RES.	RY21-2W-22KΩJ	1	R002				
5253F103Z10	CERAMIC CAP.	CT1-63V-08C-2F4-10NFZ	1	C011				
52532102K10	CERAMIC CAP.	CT1-63V-06C-2B4-1000PFK	3	C002	C006	C013		
52532152K10	CERAMIC CAP.	CT1-63V-06C-2B4-1500PFK	1	C004				
52367223J10	MYLAR CAP.	CL21X-50V-0.022μFJ	1	C001				
52367104J10	MYLAR CAP.	CL21X-50V-0.1μFJ	1	C003				
52613101M11	ELECTROLYTIC CAP.	CD110X-16V-100μFM	1	C009				
50640062820	ELECTROLYTIC CAP.	CD110X-50V-4.7μFM	2	C005	C012			
50390071060	DIODE ZENER	CW574CS	1	D001				
621038820T0	AUDION	2SC388ATM	1	V001				
621038820T0	AUDION	3DG388ATM						
50630061380	INDUTANCE	LGB0606-1.2μHK	1	L003				
50570030210	SAW FILTER	LBN38P08	1	Z001				
8289100020E	TUNER	TAF5-C4I21(JUE2.891.002)	1	A001				
51113101JU0	CARBON RES.	RT13-0.166W-100ΩJ	9	R231	R213	R214	R218	R219
				R221	R237	R238	R239	
59822050305	CARBON RES.	RT13-0.166W-120ΩJ	1	R232				
51113151JU0	CARBON RES.	RT13-0.166W-150ΩJ	1	R233				
51113471JU0	CARBON RES.	RT13-0.166W-470ΩJ	1	R228				
51113331JU0	CARBON RES.	RT13-0.166W-330ΩJ	1	R216				
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	3	R202	R206	R210		
51113332JU0	CARBON RES.	RT13-0.166W-3.3KΩJ	2	R225	R229			
51113472JU0	CARBON RES.	RT13-0.166W-4.7KΩJ	3	R203	R212	R211	R220	
51113822JU0	CARBON RES.	RT13-0.166W-8.2KΩJ	2	R215				
51113103JU0	CARBON RES.	RT13-0.166W-10KΩJ	5	R208	R209	R217	R227	R205
51113223JU0	CARBON RES.	RT13-0.166W-22KΩJ	1	R204				
50620071720	CARBON RES.	RT13-0.166W-30KΩJ	1	R223				
51113333JU0	CARBON RES.	RT13-0.166W-33KΩJ	1	R207				
51113224JU0	CARBON RES.	RT13-0.166W-220KΩJ	1	R224				
51113105JU0	CARBON RES.	RT13-0.166W-1MΩJ	1	R226				
51113155JT0	CARBON RES.	RT13-0.166W-1.5MΩJ	1	R240				
50620102300	M. OXIDE FILM RES.	RY21-0.5W-270ΩJ	1	R222				
5251C220J10	CERAMIC CAP.	CC1-63V-06C-C-22PFJ	2	C205	C207			
5251C270J10	CERAMIC CAP.	CC1-63V-06C-C-27PFJ	1	C203				

PART CODE	PART NAME	SPECIFICATION	QTY	LOCATION				
5253F103Z10	CERAMIC CAP.	CT1-63V-08C-2F4-10NFZ	7	C201	C204	C210	C214	C218
				C220	C235			
52532102K10	CERAMIC CAP.	CT1-63V-06C-2B4-1000PFK	1	C232				
52532222K10	CERAMIC CAP.	CT1-63V-08C-2B4-2200PFK	1	C219				
50640011520	MYLAR CAP.	CL21X-50V-8200PFJ	1	C211				
52367104J10	MYLAR CAP.	CL21X-50V-0.1μFJ	3	C221	C224	C213		
52367224J10	MYLAR CAP.	CL21X-50V-0.22μFJ	1	C222				
50640062240	ELECTROLYTIC CAP.	CD110X-50V-10μFM	9	C202	C209	C215	C217	C227
				C231	C234	C236	C239A	
52617P47M11	ELECTROLYTIC CAP.	CD110X-50V-0.47μFM	3	C212	C229	C233		
52617010MV0	ELECTROLYTIC CAP.	CD110X-50V-1μFM	2	C223	C225			
50640062820	ELECTROLYTIC CAP.	CD110X-50V-4.7μFM	1	C230				
50640062270	ELECTROLYTIC CAP.	CD110X-50V-2.2μFM	1	C228				
52617470M11	ELECTROLYTIC CAP.	CD110X-50V-47μFM	1	C216				
50630061080	INDUTANCE	LGB0606-10μH	2	L201	L206			
50630061390	INDUTANCE	LGB0606-12μH	1	L205				
61411075DT0	DIODE	1N4148	9	VD202	VD203	VD204	VD205	VD206
				VD210	VD216	VD217	VD218	VD220
				VD201	V201	V202		
617100210T0	DIODE	BAV21	1	G201				
61212036AT5	INDUTANCE	W05Z3.6A/GDZ3.6A	1	N202				
62210150YW0	AUDION	3CG1015-Y	2	N201				
50950010430	CRYSTAL OSCILLATOR	JA18AS-8MHz	1					
50390069040	I.C	TMP8873PSANG	1	R503				
50390069300	I.C	GDET0101-07		R532				
50390068590	I.C	AT24C16A-10PI2.7	1	R511				
50390068660	I.C	AT24C16-10PI2.7		R521				
51113750JU0	CARBON RES.	RT13-0.166W-75ΩJ	6	R522	R523	R501	R506	R531
				R502				
51113101JU0	CARBON RES.	RT13-0.166W-100ΩJ	3	R514	R517	R513	C531	
51113331JU0	CARBON RES.	RT13-0.166W-330ΩJ	1	R516				
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	2	R507				
51113104JU0	CARBON RES.	RT13-0.166W-100KΩJ	3	C511	C513	C516		
5253F103Z10	CERAMIC CAP.	CT1-63V-08C-2F4-10NFZ	1	C501				
52617010MV0	ELECTROLYTIC CAP.	CD110X-50V-1μFM	1	V501				
50640062240	ELECTROLYTIC CAP.	CD110X-50V-10μFM	2	AV501	AV502			
52613101M11	ELECTROLYTIC CAP.	CD110X-16V-100μFM	1	R608A				
62210150YW0	AUDION	3CG1015-Y	1	R606				
51113681JU0	CARBON RES.	RT13-0.166W-680ΩJ	1	R621				
51113103JU0	CARBON RES.	RT13-0.166W-10KΩJ	4	R603	R604	R601	R602	
51113153JU0	CARBON RES.	RT13-0.166W-15KΩJ	2	R605	C601			
50620071640	CARBON RES.	RT13-0.166W-24KΩJ	2	C602	C603			
50620101780	M. OXIDE FILM RES.	RY21-2W-1KΩJ	1	C604				
50640024490	CERAMIC CAP.	CT1-63V-10C-2B4-2200PFK	2	C608	C616			
52367104J10	MYLAR CAP.	CL21X-50V-0.1μFJ	3	C621	C606	C609		
52613101M11	ELECTROLYTIC CAP.	CD110X-16V-100μFM	1	C610				
52613221M11	ELECTROLYTIC CAP.	CD110X-16V-220μFM	1	C607				
52614221M11	ELECTROLYTIC CAP.	CD110X-25V-220μFM	1	C611				
52614471M11	ELECTROLYTIC CAP.	CD110X-25V-470μFM	2	VD621	VD622			
52616102M11	ELECTROLYTIC CAP.	CD110X-35V-1000μFM	1	VD604				
50640062270	ELECTROLYTIC CAP.	CD110X-50V-2.2μFM	1	V601				
61050000230	DIODE	1N4148	3	V621	R234	R236		
62118150Y16	AUDION	3DG1815-Y	1	R235				
62210150YW0	AUDION	3CG1015-Y	1	X201				
51113332JU0	CARBON RES.	RT13-0.166W-3.3KΩJ	2	C238				
51113332JU0	CARBON RES.	RT13-0.166W-3.3KΩJ		C237				
51113471JU0	CARBON RES.	RT13-0.166W-470ΩJ	1	R230				
50570080000	FILTER	LT10.7A5	1	R302				
50640023960	CERAMIC CAP.	CC1-63V-06C-C-100PFJ	1	R301				
5253F103Z10	CERAMIC CAP.	CT1-63V-08C-2F4-10NFZ	1	R305				
51113562J20	CARBON RES.	RT13-0.166W-5.6KΩJ	1	R313				
51113682J20	CARBON RES.	RT13-0.166W-6.8KΩJ	1	R446				
51113103J40	CARBON RES.	RT13-0.166W-10KΩJ	1	RF481				
50620101790	M. OXIDE FILM RES.	RY21-2W-1ΩJ	1	C435				
50620101780	M. OXIDE FILM RES.	RY21-2W-1KΩJ	1					
50620102070	M. OXIDE FILM RES.	RY21-3W-4.7KΩJ	1	C310				
515172P2J90	FUSE RES.	RF10-2W-2.2ΩJ	1	C442				
50640012680	POLYPROPYLENE CAP.	CBB81-1.6KV-6800PFH	1					
50640013940	POLYPROPYLENE CAP.	CBB81-1.6KV-6800PFH		L406				
50640011750	MYLAR CAP.	CL21X-100V-0.033μFK	1	L441				
5241D334J70	POLYPROPYLENE CAP.	CBB13-400V-0.33μFJ	1	T432				
5241D334JD0	POLYPROPYLENE CAP.	CBB13-400V-0.33μFJ						
84756003200	INDUTANCE	HXT39(JU4.756.032)	1					
8475600310B	INDUTANCE	HFT550A (JUB4.756.031)	1					
8479902470B	TRANSFORMER	BSC60J2(B)	1					
67138565305	I.C	STR-G5653	1	N603				
50390061810	I.C	TFA9842AJ/N1	1					
67113780406	I.C	LA78040	1					
67113780406	I.C	LA78040-E						
50650020140	AUDION	3DD5023	1					
50650020060	AUDION	TT2140		R902				
8782000050G	CRT PCB	JUG7.820.005	1	RW02				
50620071060	CARBON RES.	RT13-0.166W-15ΩJ	1	RW03				

PART CODE	PART NAME	SPECIFICATION	QTY	LOCATION				
50620071930	CARBON RES.	RT13-0.166W-56ΩJ	1	R903				
50620072160	CARBON RES.	RT13-0.166W-270ΩJ	3	R905	R907	R909		
51113471JU0	CARBON RES.	RT13-0.166W-470ΩJ	3	R904	R906	R908		
51113681JU0	CARBON RES.	RT13-0.166W-680ΩJ	1	R911				
50620072000	CARBON RES.	RT13-0.166W-750ΩJ	3	R912	R910	R917		
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	2	R918	R919			
51113392JU0	CARBON RES.	RT13-0.166W-3.9KΩJ	1	R914				
50620071130	CARBON RES.	RT15-0.5W-1.2KΩJ	3	R915	R916	C901		
50620103320	M. OXIDE FILM RES.	RY21-2W-12KΩJ	3	C903	C902	C909		
52532471K10	CERAMIC CAP.	CT1-63V-06C-2B4-470PFK	2					
52532331K10	CERAMIC CAP.	CT1-63V-06C-2B4-330PFK	1	W904				
50640021650	CERAMIC CAP.	CT81-250VAC-2E4-1000PFM-Y1	1	C906				
5254F102M10	CERAMIC CAP.	CT7-250VAC-2E4-1000PFM-Y1		C907				
50640024840	CERAMIC CAP.	CD85-E2GA102MYHS		C904				
52592102J20	CERAMIC CAP.	CT81-2KV-12C-2B4-1000PFK	1	C905				
52613471M11	ELECTROLYTIC CAP.	CD110X-16V-470μFM	1	D901				
52617P47M11	ELECTROLYTIC CAP.	CD110X-50V-0.47μFM	1	D902				
50640062240	ELECTROLYTIC CAP.	CD110X-50V-10μFM	1	D903				
50640061890	ELECTROLYTIC CAP.	CD110X-50V-22μFM	1	D904				
61411075DT0	DIODE	1N4148	6	D905				
61411075DT0	DIODE	2CK75D		D906	V905	V904	V901	V902
62210150YW0	AUDION	3CG1015-Y	1	V903				
62118150Y16	AUDION	3DG1815-Y	1	GZ01				
62126880010	AUDION	3DA2688-L	3					
50650030510	AUDION	2SC2688L		XPK01				
50910010000	GZS CRT SOCKET	GZS8-6-AC	1					
5360861F000	GZS CRT SOCKET	GZS8-6-1F		XK01				
8782011250C	FUNCTION KEY PCB	JUC7.820.1125	1	RK92				
51113512JU0	CARBON RES.	RT13-0.166W-5.1KΩJ	1	RK91				
51C08013006	CARBON RES.	RT13-0.166W-7.5KΩJ	1	S901				
51113103JU0	CARBON RES.	RT13-0.166W-10KΩJ	1	S902				
51113183JU0	CARBON RES.	RT13-0.166W-18KΩJ	1	S903				
50620073010	CARBON RES.	RT13-0.166W-36KΩJ	1	S904				
54167605410	TOUCH SW.	KA1W6×5-41	6	S905	S906	RK97		
8782012980C	IR RECEIVE PCB	JUC7.820.1298	1	NP11B				
51113101JU0	CARBON RES.	RT13-0.166W-100ΩJ	1	NP11B				
51113333JU0	CARBON RES.	RT13-0.166W-33KΩJ	1	NP11B				
50640062240	ELECTROLYTIC CAP.	CD110X-50V-10μFM	1					
67109138025	I.C	TSOP1238	1					
67109138025	I.C	AT138A	1	RP12A				
67109138045	I.C	HRM380017	1	RP12B				
8782012990C	IR RECEIVE PCB	JUC7.820.1299	1	VDP11A				
51113102JU0	CARBON RES.	RT13-0.166W-1KΩJ	3	VDP11B	VDP11C	RP13C		
61118003201	L.E.D	HFBA032MP-90S3	3	RP14				

The data are subject to change without prior notice.

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